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PROCEEDINGS OF THE
ROYAL ENTOMOLOGICAL SOCIETY
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VOLUME 15.

1940.

THE INSECT FAUNA OF THE WASTE AREAS OF
TILBURY DOCK

By H. M. EDELSTEN, F.R.E.S.

At the request of the Ministry of Agriculture and Fisheries I undertook during the summer of 1938 a partial survey of the insect fauna of the Tilbury Dock area. By kind permission of the Trustees of the British Museum (Natural History) I was given the services of Mr. T. G. Howarth as assistant.

The main object of this survey was connected with the occurrence of the Colorado Beetle at Tilbury the previous year. It was thought possible that it might be found on the *Solanum dulcamara* which is a known food-plant of the larva and which occurs all over the waste ground in the dock area, but although this plant was thoroughly examined on each visit, no trace of the beetle or its larvae could be found.

The area surveyed comprises the whole of the Port of London Authority land within the Customs fence, a portion outside the fence to the north-west and a triangular piece between the Main Dock, Tidal Basin and the river, known locally as the Coaling Jetty (several hundred acres in all). The terrain is bordered on the south and west by the River Thames, on the east by the London, Midland and Scottish Railway, and on the north by the Grays Thurrock marsh.

In early days it must have been an extensive area of marshland, intersected by creeks and reedy ditches, of which very little trace now remains. The area not actually occupied by the docks and jetties has for years been used as a dump heap for rubbish, and when the docks were made some of the excavated soil was also spread there.

An embanked concrete road runs through the centre of the ground from Tilbury Dock Station right round to the Main Dock, and for part of the way it is bordered by the Dock railways.

Except for a few pools and hollows, the ground level is now considerably higher than formerly.

Almost the whole area has become colonised by waste-land plants, thistles being in the majority, though in places, hemlock grows in great masses. *Solanum dulcamara* is scattered over the whole of the ground, but some of it appeared to have been cut out within the last year or so.

With the exception of the pieces adjoining the railway lines, the embankment of the road, and various portions near buildings in the dock areas, very little mowing seems to be done, only so much as is necessary to prevent damage to grass fires and to keep the railway tracks clear.

For the purposes of the survey the ground was divided into four sections,

viz. : the north and south sides of the concrete road, the Coaling Jetty piece and the allotment piece near Manor Way Gate.

The next consideration was the flora.

The north side consists of alternate hollows and raised ground. Reed grows in the hollows in some quantity, while on the higher portions thistles, teasels, hemlock and some *Lepidium draba* grow but rather more scattered than on the south side. At about the centre the ground falls away into a grassy hollow with a football field on the roadside and an area of blackthorn and hawthorn on the northern boundary. Farther west towards the river the ground rises again, where there is a mass of thistle, hemlock, ragwort and some teasel. *Solanum* is scattered over most of the higher portions.

On the south side there was a belt of *Carduus tenuiflorus* on the road bank. This gave way farther in to large masses of *Carduus lanceolatus*, hemlock and *Lepidium*. The ground falls towards a hollow in the middle where there are two reed-fringed pools. A raised cinder pathway divides the hollow. Around the pools is a grassy area dotted with small hawthorn and blackthorn bushes.

On the western side of the grassy area is a small tidal creek with some *Aster tripolium* growing in the north-west corner. The ground rises sharply beyond the creek, the western bank of which was covered with large masses of *Solanum dulcamara*. Farther west towards the lock was a very thick mass of hemlock, thistles and convolvulus. Beyond the lock was a triangular piece of ground, the flora of which was more varied and comprised *Helminthia echinoides*, *Sinapis nigra* and *S. incana*, *Picris hieracioides*, *Convolvulus sepium*, *Rapistrum linneanum* var. *glabra*, *Lepidium draba*, *Carduus lanceolatus* and *C. arvensis*, *Artemisia vulgaris*, and *A. absinthium*, *Centranthus ruber*, *Lactuca virosa* (2 forms), *Clematis vitalba*, and some hawthorn, willow, bramble, and ragwort. Some *Solanum* grew on this piece.

The Coaling Jetty piece contained the richest flora of all the sections. Parts of it were open and grassy with rather a dwarfed plant-growth. Dotted about were bushes of elder, birch, hawthorn, blackthorn, willow, sycamore, and clumps of bramble and *Clematis vitalba*. *Solanum dulcamara* grew more or less all over this section. There were three fair-sized patches of reed. Among the other plants observed were *Sinapis nigra* and *S. incana*, *Sisymbrium altissimum* (= *pannonicum*), *S. orientale* (= *columnae*), *Rapistrum linneanum* var. *glabrum*, *Helminthia echinoides*, *Picris hieracioides*, *Lactuca virosa* (2 forms), *Carduus lanceolatus* and *C. arvensis*, *Centranthus ruber*, *Senecio viscosus*, *Vicia* species, burdock, hemlock, ragwort, mayweed, and teasel. The allotment piece was also fairly rich in plant life, open and grassy at the Manor Way Gate end with a few seedling birches, willows, clumps of bramble and a strip of reed in the middle. At the northern end were a number of allotments.

Many of the bushes of *Salix caprea* to the north of the concrete road near the railway lines were infested with a gall which has a different appearance from that on *Salix alba*. Dr. A. M. Masee has identified it as *Eriophyes triradiatus* (*typicus*) Nalepa.

On 25 May I went to Tilbury, where I was met by Messrs. Buckhurst, Strang and Thomas, who pointed out to me the area to be examined on either side of the concrete road. Near Manor Way Gate there are some allotments, which were carefully examined on each subsequent visit, but without result.

On 13 and 14 June the north and south sections and the allotment piece were thoroughly explored. About 20 species of Lepidoptera and Coleoptera were noticed. *Plutella maculipennis* was abundant among *Lepidium*. *Myelois cribrella* and *Loxostege verticalis* were common among thistles. The blackthorn

and hawthorn bushes on the western side of the north-west section were almost defoliated by larvae of *Hyponomeuta padella*, which were in immense numbers. They were, however, heavily parasitised. Cuckoos in some numbers were frequenting the bushes. It is possible that they were feeding on the larvae.

From 17 to 19 June all sections were visited. With Mr. Howarth's help the sections north and south of the road were also worked at night. Both sugar and light were tried. Last year's teasel stems, cut and stuck up every few yards, for want of anything better to put the sugar on, proved quite attractive. About 60 species of Lepidoptera, including 1 *Nomophila noctuella*, were noticed.

On 18 June while visiting the allotment piece at about 6 p.m. 3 specimens of *Trichius abdominalis* Men. were found. Two of them were in *Convolvulus* blossoms and one in a bramble blossom.

From 8 to 10 July all sections were again visited. It was decided to inspect the Coaling Jetty section, which is situated outside the Customs fence and adjoins the river. Incidentally a large number of steamers put in there to coal; therefore it appeared to be a likely place for any imported species to land. We worked this piece on both nights with sugar and light, using teasel heads and straw bottle-cases and drift wood collected from the fore-shore for the sugar. A large number of species of both macro- and micro-lepidoptera were observed, but no alien species. The weather conditions on 9 July were against us. It was difficult to find any shelter from the wind, consequently the bag was a very small one.

All sections were visited from 29 to 31 July. The Coaling Jetty piece was worked at night on 29 July. This was our best night, a very large number of species being observed. One specimen of *Lorostege palealis* was taken. On the night of 30 July we worked the south side of the road, but weather conditions were bad, consequently only a few of the more robust macrolepidoptera were seen.

All sections were visited from 27 to 29 August. In addition we explored the ground outside the Customs fence to the north-west, walking from Tilbury Dock Station along the Dock Railway to the North End Gate and then turning west towards the river. At the river-side of this section there is quite a big hill of old dumped refuse. This has now become covered with waste-land plants.

Larvae of *Loxostege palealis* were abundant on *Daucus carota* growing on the grassy portions just before we reached the hill. We decided to work the Coaling Jetty piece on the night of 27 August, but on arrival there found that an extensive grass fire had set light to the old coal refuse dumped there some years ago. The fire was burning underground and had already destroyed most of the plant growth on the western half of this section. As it was then too late to get to any of the other sections, we were forced to confine ourselves to a small corner at the south-eastern end, which was away from the smoke, but rain coming on rather heavily put an end to collecting. 1 *Nomophila noctuella* was taken on this section.

The section north of the concrete road was worked on the night of 28 August. Numbers of common species were noted but *Amalthes xanthographa* was the principal visitor to the sugar and *Luperina testacea* to the light. It became cool and foggy about midnight, so we had to leave.

There was nothing very striking among the Rhopalocera. Several *Argynnis cydippe* were seen. *Vanessa cardui*, though observed in some numbers in May, was scarce in August and no larvae or pupae were found. One fresh *Colias croceus* was found on 29 August. The Essex Skipper *Adopoea lincola* was abundant on the grassy portions.

Among the Heterocera, it was interesting to find that many of the species formerly associated with the Thames marshland such as *Nonagria geminipuncta*, *N. dissoluta* and ab. *arundineta*, *Rhizedra lutosa*, *Arenostola phragmitidis*, *Leucania obsoleta*, *L. straminea* and *Chilodes maritima*, still occurred among the reeds at Tilbury. The typical black *N. dissoluta* seems to be far more plentiful than the ab. *arundineta* in this locality, about 10 *dissoluta* to 1 ab. *arundineta* were bred from collected larvae. *Triphaena pronuba* was in immense numbers and very variable. *T. interjecta* was also plentiful, flying swiftly round the bushes at dusk and as usual difficult to catch. *Proculus bicoloria* swarmed at dusk and afterwards at sugar. Two specimens of *Apamea oblonga* came to sugar near the sea-wall.

We quite expected to see *Laphygma exigua* but it did not appear.

The most interesting GEOMETRIDAE were *Hemistola chrysoprasaria*, *Horisme vitalbata* and *H. tersata*, no doubt living amongst the *Clematis vitalba*, *Scopula immutata* in the marshy places and the black ab. *rebeli* of *Cleora rhomboidaria*.

The PYRALIDINAE were quite interesting. A rather curious-looking *Ephestia elutella*, *Homoceros sinuella* which I hardly expected and *H. binaevella*. *Myelois cribrella* was very common; the larvae must control the spear thistle to some extent. In August there was hardly a flower-head without a larva. *Eurhodope advenella* and *E. suavella* turned up at light. A few *Nomophila noctuella* were seen and larvae of *Lorostege palealis* were common in heads of *Daucus*. *L. verticalis* was abundant. About 58 species of microlepidoptera were noticed. Those nice species: *Polychrosis fuligana*, *Eucosma conterminana* among the *Lactuca* and *E. pupillana*, which I had previously only seen from Portland among the *Artemisia absinthium*. Some fine *Eucosma foenella* were bred from larvae found in the roots of *Artemisia vulgaris*. *Phthorimaea costella* larvae were mining the terminal shoots of *Solanum* and were parasitised by a species of *Rhyssipolis* (BRACONIDAE). *Plutella maculipennis* was abundant among *Lepidium draba*: the larvae were much parasitised by *Angitia fenestralis* (Grav.) (ICHNEUMONIDAE).

We found Coleoptera rather scarce, possibly owing to the drought; sweeping produced very little except the *Solanum* flea beetles *Psylliodes dulcamarae* and *P. affinis*; shaking heaps of mown grass and rubbish on the banks was also unproductive; it was too dry, and rather too full of thistle stems. The most interesting capture was three specimens of the pretty chafer *Trichius abdominalis* on 18 June. It was not possible to do much with other orders but a few Hymenoptera, Hemiptera-Heteroptera, and Hemiptera-Homoptera and Diptera were noted.

LIST OF INSECTS OBSERVED.

Rhopalocera.

SATYRIDAE.

Maniola jurtina (L.).

Coenonympha pamphilus (L.).

NYMPHALIDAE.

Argynnis cydippe (L.).

Aglais urticae (L.) and larvae.

Vanessa atalanta (L.).

Nymphalis io (L.).

V. cardui (L.).

<i>Gortyna flavago</i> (Schiff.).	<i>L. lithargyria</i> (Esp.).
<i>Nonagria geminipuncta</i> (Haw.)	<i>L. conigera</i> (Fab.).
(larvae).	<i>Meristis trigrammica</i> (Hufn.).
<i>N. dissoluta</i> Tr. (larvae).	<i>Caradrina morpheus</i> (Hufn.).
<i>N. d. ab. arundineta</i> Schmidt. (larvae).	<i>C. alsines</i> (Brahm).
<i>Chilodes maritima</i> (Tausch.).	<i>C. quadripunctata</i> (Fab.).
<i>Rhizedra lutosa</i> (Hübner.) (larvae).	<i>Rusina umbratica</i> (Goeze).
<i>Arenostola phragmitidis</i> (Hübner.) (and	<i>Amphipyra tragopoginis</i> (L.).
larvae).	<i>Plusia chrysis</i> (L.).
<i>Leucania pallens</i> (L.).	<i>P. gamma</i> (L.).
<i>L. impura</i> (Hübner.).	<i>Euclidimera mi</i> (Clerck) (and larvae).
<i>L. straminea</i> Tr. (and larvae).	<i>Hyphenia proboscidalis</i> (L.).
<i>L. obsoleta</i> (Hübner.).	<i>Zanclognatha tursipennalis</i> (Tr.).

GEOMETRIDAE.

<i>Hemistola chrysoprasaria</i> (Esp.).	<i>E. linariata</i> (Fab.).
<i>Sterrhia seriata</i> (Schr.).	<i>E. centaureata</i> (Schiff.).
<i>S. fuscovenosa</i> (Gze.).	<i>E. succenturiata</i> (L.).
<i>S. aversata</i> (L.).	<i>Horisme vitalbata</i> Schiff.).
<i>S. biselata</i> (Hufn.).	<i>H. tersata</i> (Schiff.).
<i>S. dimidiata</i> (Hufn.).	<i>Abraxas grossulariata</i> (L.).
<i>Scopula immutata</i> (L.).	<i>Cabera pusaria</i> (L.).
<i>Ortholitha chenopodiata</i> (L.).	<i>Selenia bilunaria</i> (Esp.) 2 gen.
<i>Anaitis plagiata</i> (L.).	<i>illunaria</i> (Esp.).
<i>Xanthorrhoe spadicearia</i> (Schiff.).	<i>Crocallis elinguaris</i> (L.).
<i>X. montanata</i> (Schiff.).	<i>Opisthograptis luteolata</i> (L.).
<i>X. fluctuata</i> (L.).	<i>Biston betularia</i> (L.) (and larva).
<i>Epirrhoe alternata</i> (Mull.).	<i>Cleora rhomboidaria</i> (Schiff.).
<i>Euphyia bilineata</i> (L.).	<i>C. r. ab. rebeli</i> (Aign.).
<i>Eupithecia haworthiata</i> Dbldy.	<i>Aspilates ochrearia</i> (Rossi.).

ZYGAENIDAE.

Zygaena filipendulae (L.) (1 cocoon).

Pyralidina.

PHYCITIDAE.

<i>Ephestia elutella</i> (Hübner.).	<i>Myelois cribrella</i> (Hübner.) (very com-
<i>Homoeosoma sinuella</i> (Fab.).	mon and larvae).
<i>H. binaevella</i> (Hübner.).	<i>Eurhodope advenella</i> (Zinck.).
	<i>E. suavella</i> (Zinck.).

CRAMBIDAE.

<i>Crambus pascuellus</i> (L.)	<i>C. perlellus</i> (Scop.).
<i>C. pratellus</i> (L.).	<i>C. geniculeus</i> (Haw.).
<i>C. culmellus</i> (L.).	<i>C. tristellus</i> (Fab.).
<i>C. hortuellus</i> (Hübner.).	<i>Chilo phragmitellus</i> (Hübner.).

PYRAUSTIDAE.

<i>Phlyctaenia prunalis</i> (Schiff.).	<i>L. palealis</i> (Schiff.) (larvae common).
<i>P. sambucalis</i> (Schiff.).	<i>Scoparia cembrae</i> Haw.
<i>Nomophila noctuella</i> (Schiff.).	<i>Mesographe forficalis</i> (L.).
<i>Loxostege verticalis</i> (L.) (common).	<i>Endotricha flammealis</i> (Schiff.).

Microlepidoptera.

PTEROPHORIDAE.

<i>Platyptilia gonodactyla</i> Schiff.	<i>Alucita pentadactyla</i> L.
<i>P. pallidactyla</i> Haw.	<i>Pterophorus monodactyla</i> L.

PHALONIIDAE.

<i>Phalonia tesserana</i> Treits.	<i>P. pallidana</i> Zell.
<i>P. roseana</i> L.	<i>P. hybridella</i> Hübn.
<i>P. atricapitana</i> Steph.	<i>Euxanthia hamana</i> L.

TORTRICIDAE.

<i>Pandemis ribeana</i> Hübn.	<i>Cnephasia vigaureana</i> Treits.
<i>Tortrix paleana</i> Hübn.	<i>Peronea asperana</i> Hübn.
<i>T. unifasciana</i> Dup.	<i>P. variegana</i> Schiff. ab. <i>fuscana</i> Sheldon.

EUCOSMIDAE.

<i>Spilonota ocellana</i> Fab.	<i>Polychrosis fuligana</i> Haw.
<i>Notocelia uddmanniana</i> L.	<i>Argyroplote pruniana</i> Hübn.
<i>Eucosma nigromaculana</i> Haw.	<i>A. lacunana</i> Dup.
<i>E. citrana</i> Hübn.	<i>A. urticana</i> Hübn.
<i>E. pupillana</i> Clereck.	<i>Hemimene petiverella</i> L.
<i>E. conterminana</i> H.-S.	<i>H. simpliciana</i> Haw.
<i>E. cana</i> Haw.	<i>H. plumbana</i> Scop.
<i>E. foenella</i> L.	<i>H. saturnana</i> Guen.
<i>E. brunnichiana</i> Froel.	<i>Laspeyresia compositella</i> Fab.
<i>E. tripunctana</i> Fab.	

GELECHIIDAE.

<i>Metzneria metzneriella</i> Staint.	<i>P. costella</i> Westwd. (Parasite <i>Rhysipolis</i> sp. probably new.)
<i>Gelechia mulinella</i> Zell.	<i>Brachmia gerronella</i> Zell.
<i>Phthorimaea obsoletella</i> Fisch.	<i>B. rufescens</i> Haw.

COSMOPTERYGIDAE.

Chrysoclista hellerella Dup.

OECOPHORIDAE.

Carcina quercana Fab.*D. badiella* Hübn.*Depressaria weirella* Staint.*D. alstroemeriana* Clerck.

GLYPHIPTERYGIDAE.

Simaethis fabriciana L.

ELACHISTIDAE.

Elachista atricomella Staint.

HYPONOMEUTIDAE.

Argyresthia nitidella Fab.*Hyponomeuta padella* L.

COLEOPHORIDAE.

Coleophora nigricella Steph.*C. glaucicolella* Wood.

GRACILARIIDAE.

Lithocolletis viminella Staint.*Acrocercops omissella* Staint.

PLUTELLIDAE.

Plutella maculipennis Curt. (Parasite *Angitia fenestralis* Holmgr.)

TINEIDAE.

Monopis ferruginella Hübn.*Ochsenheimeria bisontella* Hübn.*Tinea pallescentella* Staint.

HEPIALIDAE.

Hepialus lupulinus L.*H. sylvinus* L.

Coleoptera.

CARABIDAE.

Dichirotrichus pubescens (Pk.).*O. ardosiacus* Luts.*Calathus melanocephala* (L.).*Pterostichus madidus* (Fab.).*Dromius linearis* (Ol.).*Harpalus tardus* (Pz.).*D. nigriventris* Th.*Amara lunicollis* Sd.*Ophonus pubescens* (Mull.).

STAPHYLINIDAE.

Tachyporus chrysomelinus (L.).*Staphylinus olens* Ml.*Quedius molochinus* (Gr.).

COCCINELLIDAE.

- | | |
|---|--|
| <i>Coccidula scutellata</i> (Hbst.). | <i>C. 11-punctata</i> (L.). |
| <i>Rhizobius litura</i> (Fab.). | <i>Subcoccinella 24-punctata</i> (L.). |
| <i>Coccinella 7-punctata</i> (L.). | <i>Thea 22-punctata</i> (L.). |
| <i>C. 10-punctata</i> ab. <i>bimaculata</i> (L.). | |

NITIDULIDAE.

- | | |
|-----------------------------------|-------------------------------|
| <i>Brachypterus glaber</i> Steph. | <i>Pria dulcamarae</i> (Sc.). |
| <i>Meligethes aeneus</i> (Fab.). | |

BYTURIDAE.

- Byturus tomentosus* (Fab.).

SCARABAEIDAE.

- Trichius abdominalis* Men.

ELATERIDAE.

- Agriotes sputator* (L.).

CANTHARIDAE.

- | | |
|----------------------------------|---------------------------------|
| <i>Malachius viridis</i> Fab. | <i>Rhagonycha fulva</i> (Sp.). |
| <i>Cantharis pallida</i> (Gze.). | <i>Silis ruficollis</i> (Fab.). |
| <i>C. rustica</i> Flin. | |

CHRYSOMELIDAE.

- | | |
|------------------------------------|-------------------------------------|
| <i>Psylliodes dulcamarae</i> Koch. | <i>Cassida rubiginosa</i> Mull. |
| <i>P. affinis</i> (Payk.). | <i>Crepidodera ferruginea</i> Scop. |
| <i>Phaedon tumidulum</i> Gm. | |

OEDEMERIDAE.

- | | |
|-------------------------------|-------------------------------|
| <i>Oedemera lurida</i> (Mm.). | <i>Nacerda melanura</i> (L.). |
|-------------------------------|-------------------------------|

CURCULIONIDAE.

- | | |
|-------------------------------|-------------------------------------|
| <i>Dorytomus dejeani</i> Fst. | <i>Phyllobius viridacris</i> Laich. |
| <i>Apion radiolus</i> K. | <i>Otiorynchus ovatus</i> L. |
| <i>A. aeneum</i> Fab. | <i>Ceuthorrynchus litura</i> Fab. |
| <i>A. carduorum</i> K. | <i>C. pollinarius</i> Först. |

Hemiptera-Heteroptera.

PENTATOMIDAE.

- | | |
|-------------------------------------|--|
| <i>Sehirus bicolor</i> (L.) nymphs. | <i>Gnathoconus albomarginatus</i> Goeze. |
|-------------------------------------|--|

Mr. H. M. Edelsten on

TINGIDAE.

Tingis cardui L.

NABIDIDAE.

Nabis major Costa nymph.

ANTHOCORIDAE.

Anthocoris nemorum (L.).

CAPSIDAE.

Brachyceraea errans (Wolff).*Phytocoris varipes* Boh.*Capsus ater* L.*Liocoris tripustulatus* Fab.*Lygus campestris* L.*Heterotoma meriopterum* Scop.*Plagiognathus arbustorum* Fab.

Hemiptera-Homoptera.

DELPHACIDAE.

Asiraca clavicornis Fab.

PSYLLIDAE.

One sp. indet.

Hymenoptera.

VESPIDAE.

Ancistrocerus albotricinctus (Zett.).

ICHNEUMONIDAE.

Angitia fenestralis (Hölingr.).*Banchus volutatorius* (L.).*Glypta bicornis* Boie.*Pimpla spuria* Grav.*Goniocryptus plebejus* Tschek.

BRACONIDAE.

Microgaster sp.*Rhysipolis* sp.

Diptera.

ASILIDAE.

Dioctria atricapilla Mg.

THEREVIDAE.

Thereva ? nobilitata Fab.

STRATIOMYIIDAE.

Nemotelus notatus Zett.

Microchrysa polita L.

SYRPHIDAE.

Eristalis aeneus Scop.

TRYPETIDAE.

Trypeta florecentiae L.

The total number of species observed is :—

Rhopalocera	.	.	.	.	.	15
Heterocera	.	.	.	.	.	183
Coleoptera	.	.	.	.	.	46
Hemiptera—Heteroptera	.	.	.	.	.	12
Hemiptera—Homoptera	.	.	.	.	.	1
Hymenoptera	.	.	.	.	.	8
Diptera	.	.	.	.	.	6
						<hr/> 271 <hr/>

I wish to thank my colleagues at the British Museum (Natural History) for their help in identifying the various species and plants and Mr. T. G. Howarth for drawing a botanical map.

BOOK NOTICE.

Nature Parade. By F. W. LANE. pp. 316, 63 pls. 8vo. London (Jarrolds). (1939.) Price 15s.

This book contains 14 chapters arranged in 3 sections. The first is entitled Private Lives and comprises the chapters on Food, Toilet, Sleep, Leadership, Strength, War and Doctoring. The second is entitled Speed and Locomotion with the chapters on Animals, Fish, Birds, Insects, and Out of their element. The third and last has but two chapters on Animals we never see alive because they are rare or mysterious.

The author has “. . . attempted a synthesis of the more unusual observations which have been made . . . by naturalists, explorers, scientific workers, and chance observers of animals in all parts of the world.” It will therefore be understood that the book has a “popular” appeal.

Among some of the statements here brought together attention may be directed to the tables of comparative speed. It is unfortunate that the table of speed of “insects” opens with the speed of a burrowing earthworm and includes several Mollusca, but it is well to know where to find such an attempt at cataloguing the speed of movement of animals.

BOOK NOTICE.

The Louse. An account of the Lice which infest man, their medical importance and control. By P. A. BUXTON. pp. ix + 115, 28 figs. 8vo. London (Arnold). (1939.) Price 7s. 6d.

This book is concerned with *Pediculus humanus* and *Phthirus pubis*. It comprises 6 chapters as follows: The Anoplura or Sucking Lice; The Anatomy of *P. humanus*; The Biology of *P. humanus*; The medical importance of *P. humanus*; The control of *P. humanus*; and The Crab Louse (*Phthirus pubis*). An appendix deals with methods of rearing and methods of feeding and infecting lice by rectal injection. A list of references extending to 7 pages and index complete the volume.

The book was originally written as part of a larger work on medical entomology designed for readers with some knowledge both of entomology and medicine. The author has, however, attempted to make it comprehensible to those who lack the one or the other. In the belief that to control an insect, full general knowledge of all parts of its life must be available, attention is concentrated more on the biology than the anatomy of the louse.

BOOK NOTICE.

Grassroot Jungles. A book of Insects. By E. W. TEALE. 8vo. London (Putnam) [n.d.]. pp. xii + 233, 130 figs. Price 15s.

In this book are illustrations of many everyday insects of North America. Most of the pictures are greatly enlarged and thereby give a wealth of detail not normally visible to the average person. The half-tone reproductions are excellent and the collection reproduced is but a small selection from the thousands of negatives made by the author.

A narrative written in popular style serves as a background to the pictures.

BOOK NOTICE.

The Mind of the Bees. By J. FRANÇON. Translated by H. ELTRINGHAM. 8vo. London (Methuen) (1939). pp. xi + 146, 11 figs. Price 6s.

This book is translated from the French. It tells the results of personal observations and experiments to discover what bees can do. The sections of the book are: the methodical organisation of the work of the bees; memory, sense of orientation and survey; bees and colours; and intercommunication between the bees.

The translator in his preface says: "At a time when even the vocabulary of Science is a mystery to the uninitiated, it is a joy to find a work which can be read with intelligence and delight by a child and yet contains material of the greatest scientific interest."

PHENOLOGICAL OBSERVATIONS ON THE BRIMSTONE BUTTERFLY, *GONEPTERYX RHAMNI* (LINN.) (LEPID.)

By G. FOX-WILSON, N.D.H., F.R.E.S., F.L.S.

(*R.H.S. Laboratory, Wisley.*)

THIS familiar butterfly is the first of the hibernating species to appear in early spring, and it has been suggested that the date of the first re-appearance of this species at the Royal Horticultural Society's Gardens, Wisley, Surrey, over a period of twenty years should be placed on record.

The first specimen of this so-called "editorial butterfly" to appear at Wisley is along the edge of a mixed Larch and Scot's Pine wood sloping due south, and hibernated specimens are usually to be found in certain large Holly trees which grow along the outer rim of this wood and in clumps of Ivy on some ancient Oak trees, both of which plants provide hibernacula.

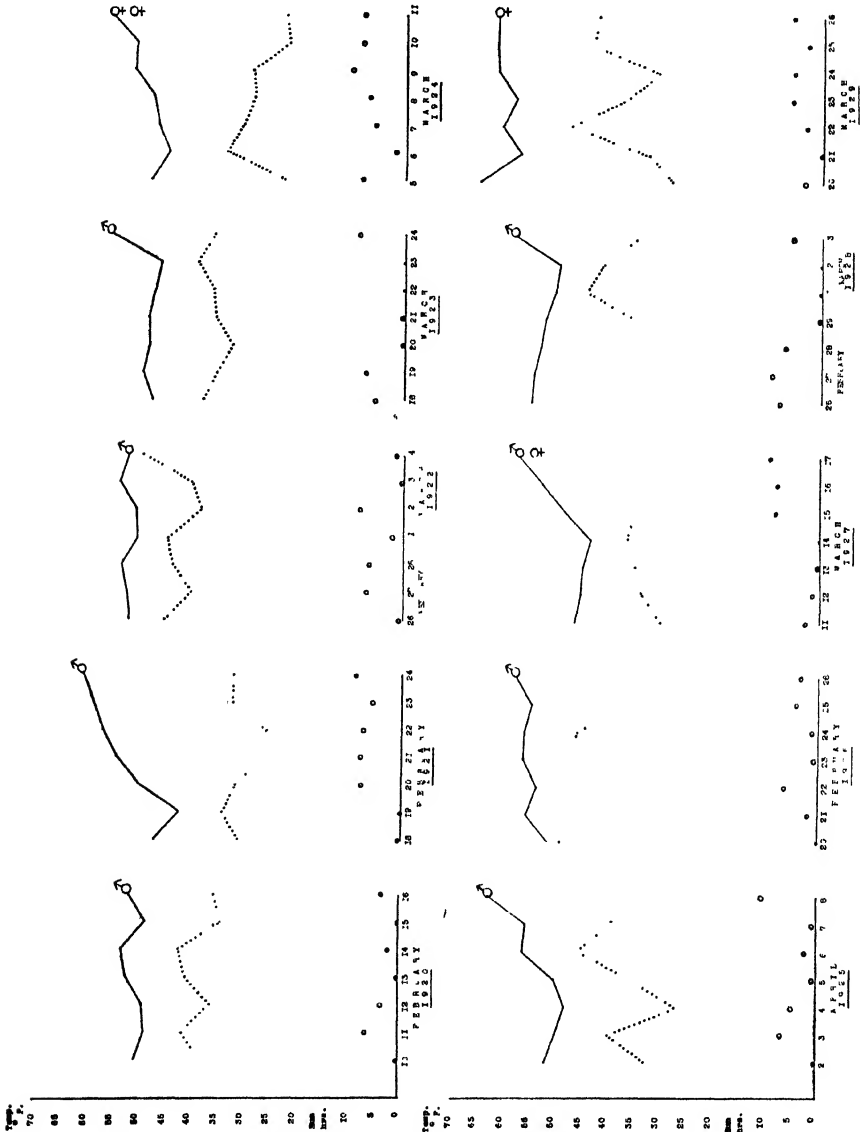
This butterfly commences to fly regularly about mid-April, but in some years it has been found at Wisley on the wing in mid-February (1896, 1920), and even in December (19th Dec. 1932). It has been stated (Thompson, 1934) that a temperature of 60° F. is necessary to awaken a torpid insect, and that this temperature in winter is very fugitive, for any obscurity of the sun by cloud lowers the temperature and, incidentally, reduces the vigour of the insect. Our records show that the torpid Brimstone frequently re-awakens and becomes active on the wing at temperatures below 60° F. (*vide* Meteorological Charts).

To attempt to forecast the date of emergence of *G. rhamni* from hibernation on data based solely on the maximum day temperature is not possible; for other factors, namely the minimum night temperatures and hours of sunlight over a period of a few days prior to its re-appearance, are concerned with the renewed activity of the species. There is, of necessity, a pre-period of "warming-up" necessary to awaken the torpid insect and to induce it to leave the shelter of its hibernaculum. For instance, in 1929, the first appearance of this butterfly was on the 26th March, but an examination of the meteorological data shows that a higher maximum temperature (66° F.) was recorded on the 20th March but the minimum temperatures at this time and for a period of days prior to the 20th were low compared with those prevailing immediately prior to its re-appearance on the 26th March.

It has been mentioned that this butterfly (♂) was on one occasion seen flying in December, and this insect had been subjected to a period of "warming-up" when the maximum day temperatures during the week prior to its appearance ranged from 49–55° F., with minimum night temperatures of 29.5–49° F., with two bright days (3.6 and 2.1 hours of sunshine respectively) immediately prior to its emergence.

Records of the first re-appearance of the Brimstone butterfly have been taken at Wisley over a period of twenty years (1920–1939), and these have been correlated with the maximum and minimum temperatures and hours of sunshine for a period of seven days prior to the emergence from hibernation. Information, though available, of other meteorological data—relative humidity readings and rainfall—is not given, for a study of such data appears to show no effect on the awakening process of the torpid insect. The factors that influence the re-appearance of the species are temperature and illumination, the former including

the maximum and minimum temperatures over a period of a few days prior to the spring advent, and the latter indicating sunlight, for never has the first butterfly at Wisley been observed flying on a sunless day even though the maximum and minimum temperatures have been favourable for such an event.



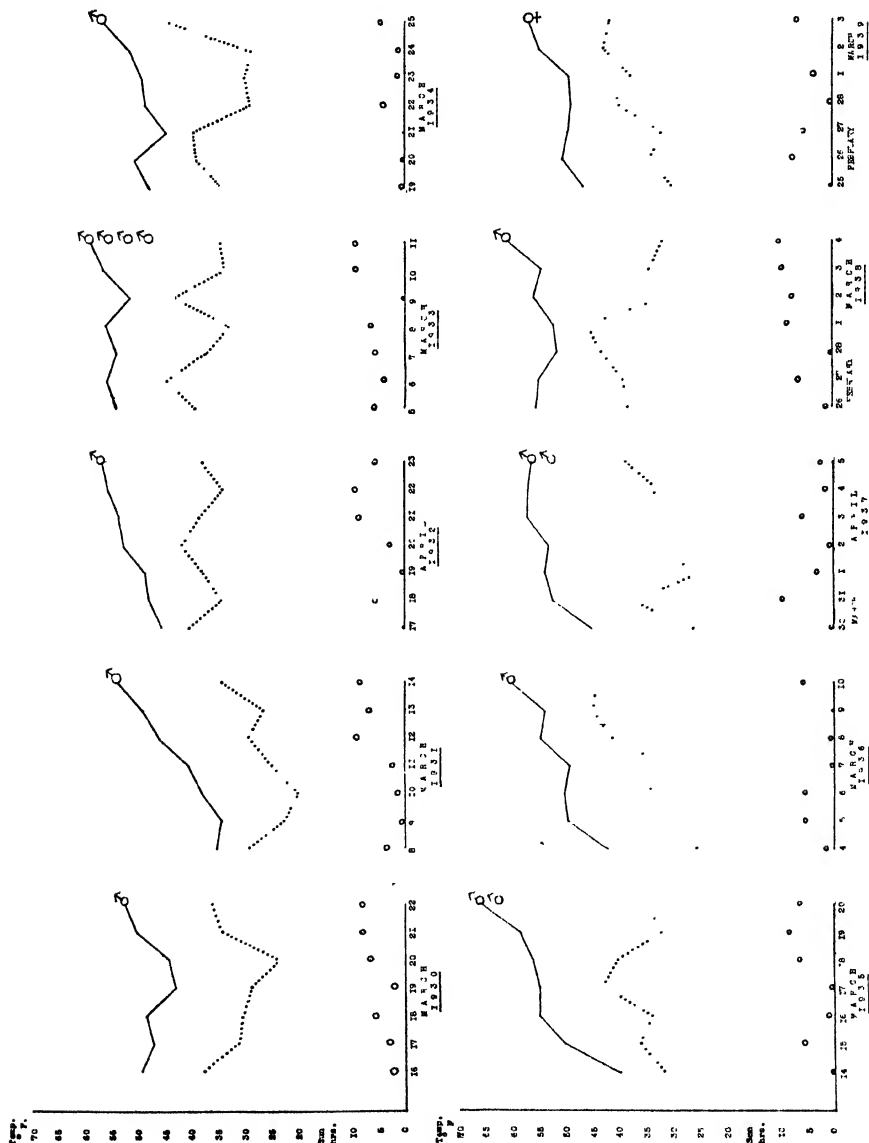
Maximum and minimum temperatures and amount of sunshine for a period of seven days prior to the first appearance of *G. rhamni* 1920-1929.

Some earlier records of the first appearance of this butterfly at Wisley were found and are herewith given. These records were made by the gardener (1909) of the late Mr. G. F. Wilson (the former owner of the Wisley Gardens),

but it is not possible to give information concerning weather conditions prevailing over this period of years.

1891 17th April.
1892 25th February.
1893 19th February.
1894 25th March.
1895 10th April.
1896 11th February.

1897 18th February.
1898 no date
1899 13th March.
1900 10th March.
1901 no date
1902 6th March.



Maximum and minimum temperatures and amount of sunshine for a period of seven days prior to the first appearance of *G. rhamni* 1930-1939.

YEARS 1920-1939.

1920	16th February	♂.	1930	22nd March	♂.
1921	24th February	♂.	1931	14th March	♂.
1922	4th March	♂.	1932	23rd April	♂.
1923	24th March	♂.	1933	11th March	♂♂♂♂.
1924	11th March	♀♀.	1934	25th March	♂.
1925	8th April	♂.	1935	20th March	♂♂.
1926	26th February	♂.	1936	10th March	♂.
1927	17th March	♂♀.	1937	5th April	♂♂.
1928	3rd March	♂.	1938	4th March	♂.
1929	26th March	♀.	1939	3rd March	♀.

SUMMARY.

The dates of the first re-appearance of the Brimstone butterfly at the Royal Horticultural Society's Gardens, Wisley, Surrey, are given for a period of twenty years.

The meteorological data—maximum and minimum temperatures and hours of sunshine—over a period of seven days prior to the appearance of this species each year are set out, and indicate the effect of a pre-period of "warming-up" that is essential to awaken the torpid insect.

REFERENCES.

- THOMPSON, A. R., 1934, *Nature by day* : 140-141.
1909, *J. R. hort. Soc. Gardens Club* 2 : 28.

BOOK NOTICE.

Classified Index of Entomological Contributions to the *Scottish Naturalist* from its commencement in 1871 to the end of 1938. By P. H. GRIMSHAW. 8vo. (*Scottish Naturalist*, 1939.) pp. 65. Price 2s.

This classified index appeared in several parts in the *Scottish Naturalist*.

It is arranged by Orders and Families of insects, and the entries under each heading are arranged alphabetically by authors. The number of entries indexed is approximately 1250; entries of interest to more than one Order are usually repeated. Special note is made of all Vice-County records and a list of the Vice-Counties concerned is given in the introduction.

THE SEXUAL RATIO OF THE COMMON EARWIG, *FORFICULA AURICULARIA* L. (DERMAPT.), AS OBSERVED IN TRAP BANDS

By G. FOX-WILSON, N.D.H., F.R.E.S., F.L.S.

(R.H.S. Laboratory, Wisley.)

THE gregarious habits of the Common Earwig, *Forficula auricularia* L., have been mentioned by various authors (Burr, 1939; Lucas, 1920; Worthington, 1926), and this note deals exclusively with this characteristic.

During August, September and October it is common to find assemblages, often very large, of Earwigs hiding in suitable crevices, for instance, in the uppermost internodal area of Bamboo support-canes (fig. 1), and beneath old grease-bands and corrugated-paper and sack-bands, both of which are frequently placed on the stem of standard and half-standard fruit trees for the capture of the apterous ♀♀ of various "Winter Moths," and for the trapping of the adult Apple Blossom weevil, *Anthonomus pomorum* (L.), and/or the larvae of the Codling moth, *Cydia pomonella* (L.)

It is the practice at the Royal Horticultural Society's Gardens at Wisley to allow the grease-bands to remain on the stem of certain standard fruit trees (19 Apples, 10 Pears, 6 Plums—*vide* Plan) for twelve months. These bands are removed during early October each year, and are replaced by fresh bands some days later. It was found that large numbers of sexually mature Earwigs congregated beneath the old bands, and it has been our practice to collect the insects annually and to ascertain the sexual ratio of the adults (Table I and Graph).

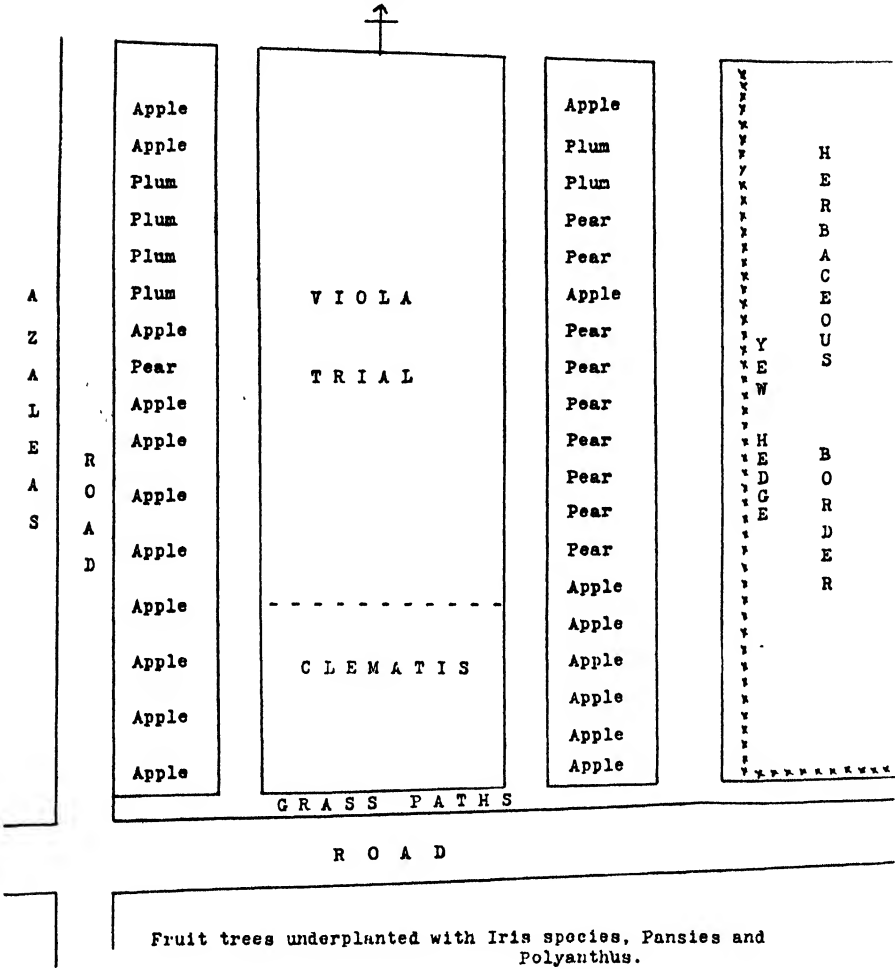
A number of macrolabious forms—generally referred to as the variety *forcipata*—are found each year, and their number appears in Table I. Among the colonies are to be found a certain number of individuals with abnormal callipers, especially among the males. It is suggested that this abnormality is due to the cannibalistic or fighting habits of the species.

In considering the senses of the Common Earwig, Burr (1939) states that thigmotropism is stronger even than the negative phototropism to which they react, and states: "There is certainly connection between this thigmotropism and their gregarious habits. In everyday language, we should say that they derive a feeling of comfort from the contact of their kind." The dominant stimulus is, therefore, tactile.

It will be noted (Table I) that the number of Earwigs found beneath the bands in 1935 and 1938 † was the lowest on record; this being due to the stripping of the bands in July by birds, especially Jays and Great Tits, which were seeking the larvae of the Cherry Bark Tortrix, *Eucosma woebariana* (Schiff.). During these years the larvae occurred in considerable numbers tunnelling in the bark of the several fruit trees, and more especially in the confines of the bands.

The reason for the marked fluctuations in number over the years 1928–1939 is due chiefly to parasitism by Tachinid flies (Thompson, 1928). The type of ground vegetation in the immediate vicinity of these thirty-five standard

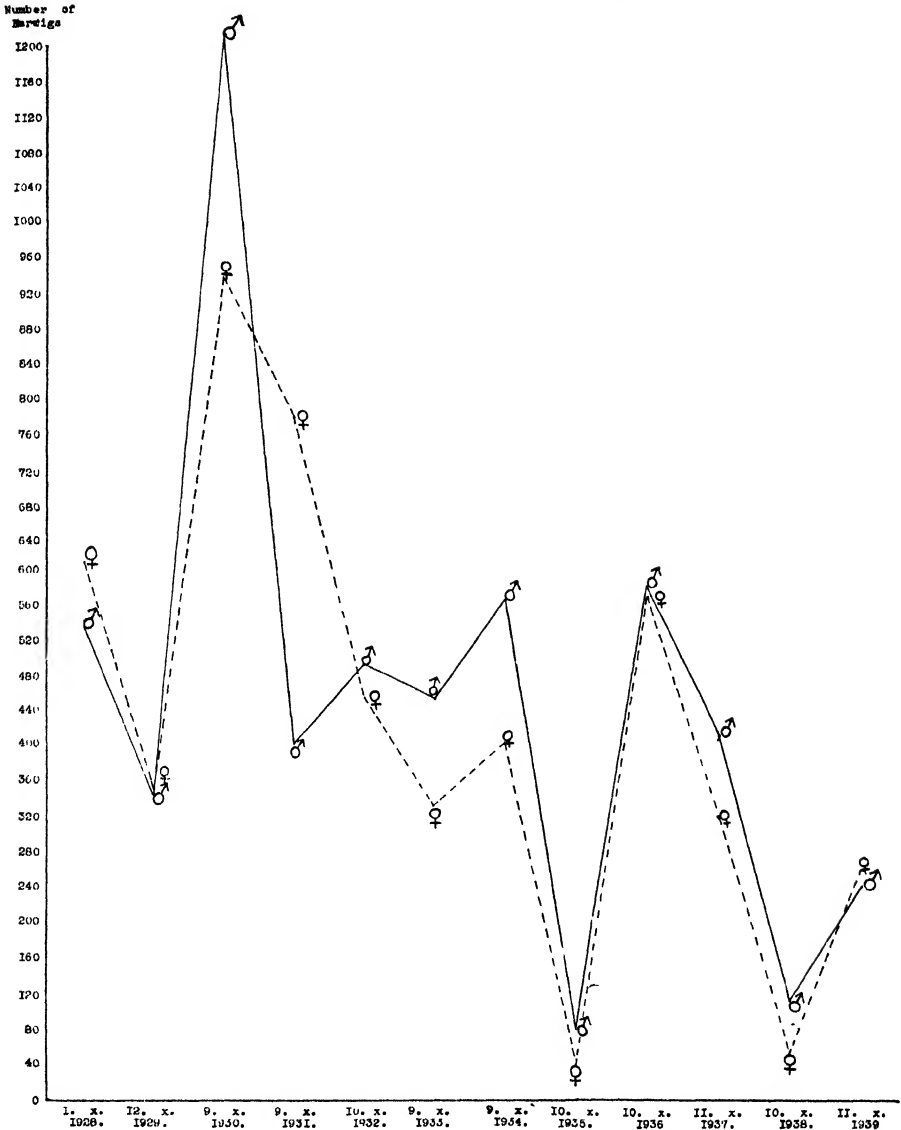
PLAN OF STANDARD FRUIT TREES UPON WHICH THE
RECORDS OF EARWIG POPULATIONS WERE TAKEN.



fruit trees has remained constant (*vide* Plan), so that the food of the Earwigs existing in this area has been the same for some fifteen years. We have not observed any migration of Earwigs from or to this site from other areas at Wisley, and the marking of individuals supports this. Our observations do, however, show that there exists in the Wisley Gardens several distinct and separate colonisations with little or no contact one with the other.

An attempt was made to correlate the relationship between population figures and climatic conditions, but no significant relationship appears to exist and it is, therefore, unnecessary to provide meteorological data for the years in question.

My thanks are due to my colleague, Mr. F. C. Brown, for the photograph illustrating the assemblage of Earwigs in a bamboo cane.



Number of *F. auricularia* (♂♂, ♀♀) captured beneath Grease-bands, 1928-1939 (see Table I).

SUMMARY.

The gregarious habits of the Common Earwig, *F. auricularia* L., are considered, together with the sexual ratio of insects found sheltering beneath trap-bands on fruit trees.

The number of macrolabious forms found in the colonies is given.

The limiting factor affecting the population is one of parasitism, and climatic conditions do not appear to exercise any marked influence on the number of Earwigs.



FIG. 1.—An assemblage of *Forficula auricularia* L. in internodal area of Bamboo support-cane.

TABLE I.

Date	♂♂, no.	♀♀, no.	♂♂, var. <i>forcipata</i>	♂♂, %	♀♀, %	Total
1.x.1928	534	619	11	46.7	53.3	1164
12.x.1929	349	355	3	49.8	50.2	707
9.x.1930	1207	932	9	56.6	43.4	2148
9.x.1931	410	784	1	34.4	65.6	1195
10.x.1932	499	466	8	52.1	47.9	973
9.x.1933	443	336	9	57.4	42.6	788
9.x.1934	557	406	16	58.5	41.5	979
10.x.1935	81	40	2	67.5	32.5	123†
10.x.1936	592	587	2	50.3	49.7	1181
11.x.1937	422	320	1	56.8	43.1	743
10.x.1938	117	56	1	67.8	32.2	174†
11.x.1939	247	266	2	48.3	51.7	515

REFERENCES.

- BURR, M., 1939, *Science Progress* 34 : 20-30.
 LUCAS, W. J., 1920, *Monograph of British Orthoptera* : 51-52.
 WORTHINGTON, E. B., 1926, *Entomologist* 59 : 138-142.
 THOMPSON, W. R., 1928, *Parasitology* 20 : 123-158.

ON THE OCCURRENCE OF MALES OF *RHODITES ROSAE* (L.) (HYMENOPTERA, CYNIPIDAE)

By E. McC. CALLAN, B.Sc., A.R.C.S., D.I.C., Ph.D., F.R.E.S.

(Entomology Department, Imperial College of Tropical Agriculture, Trinidad, B.W.I.)

Introduction and Methods Used.

THE Cynipid genus *Rhodites* is represented in Great Britain by four species, the larvae of which cause galls of distinct and characteristic appearance on various wild roses. The most abundant species, *Rhodites rosae* (L.), produces the gall known as the robin's pincushion, moss gall or bedeguar. *R. eglanteriae* Htg. gives rise to the smooth pea gall, and *R. rosarum* Gir. the spiny pea gall. *R. spinosissimae* Gir., which is the rarest of the four species, produces a gall which may assume various shapes. *R. rosae* occurs throughout Europe and western Asia and also in North America. The other species are apparently confined to Europe.

The community of insects inhabiting the galls of the first three species was studied. During the autumn of 1934, 125 *R. eglanteriae* and 44 *R. rosarum* galls were collected, and an additional 85 *R. eglanteriae* galls during the autumn of 1935. These were obtained from various localities in south Buckinghamshire and from localities in Surrey and Cumberland.

A more detailed study was made of *R. rosae* galls, as it was possible to collect these in large numbers. The majority of *R. rosae* galls were collected during the winter of 1934-35, 1059 galls being obtained altogether. A few of these were collected as early as October and as late as April, but most of them, *i.e.* more than 82%, were collected in February and March. An additional collection of 79 galls was made during the winter of 1935-36. The majority of *R. rosae* galls were collected from 26 localities in south Buckinghamshire within 20 miles of Slough. Some galls, however, were collected from a number of localities in Hampshire, Surrey, Cumberland and Yorkshire.

It was found to be essential to collect galls only after the gall-feeding larvae were fully fed. The galls could then be stored and subjected to a certain amount of drying without harming the occupants. *R. eglanteriae* and *R. rosarum* galls were stored in 3-in. by 1-in. glass tubes either fitted with corks or capped with muslin. The smaller *R. rosae* galls were similarly stored, while the larger galls were kept in glass jars of various sizes capped with muslin. It was found to be an advantage to allow the galls to lie upon a layer of dry sand rather than directly on the bottom of the storage vessels. In this way, any slight amount of moisture collecting at the bottom of the vessels was absorbed by the sand, and insects appearing from the galls were always in a perfectly dry condition, which facilitated identification, and were never attacked by moulds. The tubes and jars containing the galls were stored in a small summer-house with a permanently open doorway on the south-west side. The conditions of temperature and humidity prevailing in this improvised insectary were found to approximate to those in the open air.

Only 815 of the *R. rosae* galls produced insects. In all 24,393 insects appeared

PROC. R. ENT. SOC. LOND. (A) 15. PTS. 1-3. (MARCH 1940.)

KEYS TO SOME INDIAN GENERA OF CARABIDAE (COL.).

XI. THE GENUS *ABACETUS*

By H. E. ANDREWES, F.R.E.S.

THE genus *Abacetus* Dejean (type *A. gagates* Dejean, 1828) comprises a large number of species, widely spread in Africa, Asia, and Australia, with a single species in southern Europe. Chaudoir published a monograph on it in 1869; in this some 25 Indian species were enumerated, and the number, allowing for both additions and deductions, has since risen to 40. To these must now be added 21 new species included in the key and described at the end of it, making 61 in all. A few notes on the characters of the Indian species are added below, and, in order to save space, many of the characters included in the key have been omitted in the descriptions.

The genus belongs to the great group Pterostichini, and it differs from all the other members of the group in having the second joint of the antennae attached to the first excentrically. Body glabrous (Indian species), generally convex.

Head with large and nearly always prominent eyes, clypeus with a seta usually placed at or near each front angle, but sometimes a little behind it, occasionally with a border in front, or more often a transverse depression, frontal furrows generally deep, but variable in form, mentum with a shallow sinus and a short, usually rounded tooth, submentum with two setae on each side, antennae generally filiform, setose from and including joint 4, but in rare instances the upper half of joint 3 is setulose. *Prothorax* cordate, quadrate, or cyathiform (*i.e.* with the sides very strongly rounded and sharply sinuate a little before base, which forms, as it were, a kind of stalk), the base normally truncate and somewhat oblique at sides, sometimes bordered and sometimes with a false border formed by pores only, the sides bordered and bisetose; median line generally fine in front, deeper behind, the basal foveae taking the form of linear furrows, almost parallel, but usually converging slightly in front. *Elytra* 9-striate, without scutellary striae, stria 2 arising in an umbilicate pore, a single dorsal pore nearly always present, placed as a rule slightly behind middle. Microsculpture usually present but variable in character. Prosternal process nearly always bordered, metepisterna nearly always longer than wide, generally much longer, apical ventrite with one seta on each side in the ♂, two setae in the ♀. Protibiae with the apical spur simple or tridentate, meso- and meta-tarsi usually with at least a slight outer sulcus or carina, sometimes plurisulcate, claw joint generally glabrous beneath, but sometimes with a few setae.

My Catalogue of Indian CARABIDAE shows where the types are to be found, and I have seen all of them, except one of Motschulsky's, which has perished, and two of Tchitcherin's.

Descriptions of the new species follow the key, and it is intended to place types in the British Museum. At the end I have added some notes made a few years ago from the type specimens to supplement Bates' too laconic descriptions of three of Fea's Burmese species.

*Key to the species.*¹

- 1(18). Meso- and meta-tarsi plurisulcate, protibiae with a trifid spur at apex.
Black species, sometimes iridescent, not less than 8.5 mm. in length.
- 2 (7). Prothorax with the longitudinal furrows joining the marginal channels on each side by a sulcus along base.

¹ Owing to some variability *quadriguttatus* Chaud. has been included twice.

- 3 (6). Prothorax only vaguely punctate between the furrows, its sides not explanate, protarsi with a median carina.
- 4 (5). Prothorax about a fifth wider than long, its sides moderately rounded, with rather narrow marginal channels, elytral striae moderately impressed, length 8.5-9 mm. (India, Ceylon) *atratus* Dej.
- 5 (4). Prothorax about a third wider than long, its sides strongly rounded, with fairly wide marginal channels, elytral striae deep, length 9-10 mm. (India) *reflexus* Chaud.
- 6 (3). Prothorax closely punctate between the furrows, its sides explanate, more widely behind, protarsi without a median carina, length 9-10 mm. (N.E. India, Burma) *marginicollis* Chd.
- 7 (2). Prothorax with the furrows not joining the marginal channels along base.
- 8(15). Sides of prothorax rounded throughout, or sometimes straight behind, without any projecting tooth on each side at hind angles.
- 9(10). Sides of prothorax straight behind, hind angles sharp and almost right, base punctate between the furrows, elytra iridescent, length 9-10 mm. (Bengal, Burma) *birmanus* Bates.
- 10 (9). Sides of prothorax rounded throughout, hind angles obtuse, base impunctate (or very nearly so) between the furrows.
- 11(12). Marginal channels of prothorax moderately wide, borders not much reflexed, metepisterna nearly as wide as long, impunctate, protarsi with a median carina, elytra iridescent, length 10 mm. (Dehra Dun) *iricolor* Andr.
- 12(11). Marginal channels of prothorax narrow, borders strongly reflexed, metepisterna much longer than wide, punctate, protarsi without median carina.
- 13(14). Furrows of the prothorax narrow and rather shallow, hind angles a little rounded, elytra iridescent, striae impunctate, length 10-11 mm. (Central Provinces, Burma) *insolatus* Bates.
- 14(13). Furrows of the prothorax fairly deep, hind angles not rounded, elytra not iridescent, striae finely punctate, length 10 mm. (Dehra Dun) *silvanus* sp. n.
- 15 (8). Sides of prothorax straight or slightly sinuate behind, with a minute projecting tooth on each side at hind angles.
- 16(17). Marginal channels of prothorax narrow, apex as wide as base, elytral striae impunctate, protarsi with a median carina, length 9-10 mm. (Central and Southern India, Ceylon) *cordicollis* Chaud.
- 17(16). Marginal channels of prothorax fairly wide, apex much narrower than base, elytral striae punctate, protarsi slightly sulcate, length 10-11 mm. (N. India) *impressicollis* Dej.
- 18 (1). Meso- and meta-tarsi not plurisulcate, protibial spur not trifid.
- 19(84). Frontal furrows not extending beyond mid-eye level.
- 20(77). Frontal furrows usually deep, sometimes straight, but more often curving sharply outwards behind towards the front supraorbital pore, from which they are generally separated on each side by a very short ridge (a slight ridge may be present on each side behind, but, if so, unconnected with the frontal furrows).
- 21(72). Metepisterna longer than wide, generally much longer.
- 22(35). Base of prothorax distinctly bordered between the furrows (excluding species which have a false border formed by a row of pores along the margin).
- 23(34). Prothorax with the furrows joining marginal channels along base, microsculpture of the elytra formed by transverse lines or meshes.
- 24(25). Prothorax impunctate, cyathiform, base narrower than apex, sides explanate, elytra iridescent, black with an aeneous gloss and an apical fulvous spot on each, length 9 mm. (Tenasserim) *illuminans* Bates.

- 25(24). Prothorax punctate between the furrows, sides not explanate, elytra with or without pale spots, length not exceeding 7 mm.
- 26(27). Prothorax cyathiform, base narrower than apex, the furrows meeting the base practically at the angles, elytra black with greenish reflections, each with a shoulder and apical pale spot, length 4.5-5 mm. (Burma, Indo-China, Java, Sumatra) . . . *quadriguttatus* Chaud.
- 27(26). Prothorax not cyathiform, base at least as wide as apex, the furrows meeting the base at a little distance from the angle.
- 28(29). Marginal channels of prothorax fairly wide, narrowing abruptly just before base, elytra black, without pale spots, palpi, antennae, and legs flavous, length 5-6 mm. (North India, Burma) *amplicollis* Bates.
- 29(28). Marginal channels of prothorax narrow, elytra black or blue-black, each with at least a pale apical spot.
- 30(33). Prothorax more than a third wider than long, its sides hardly sinuate behind, but with a small tooth at each hind angle, antennae partly infusate, elytral spots fairly small, generally transverse.
- 31(32). Basal border of prothorax straight, elytra black, each with an apical spot, legs mainly infusate, length at least 6.5 mm. (Assam, Burma) *visignatus* Bates.
- 32(31). Basal border of prothorax bent forward on each side at the point where the furrows meet the basal sulcus, elytra blue-black, each with an apical and frequently also a shoulder spot, legs ferruginous, length about 5.5 mm. (Northern and Central India, Ceylon, Burma) *guttula*² Chaud.
- 33(30). Prothorax less than a third wider than long, its sides sinuate at a little distance from base, antennae ferruginous, elytral spots fairly large, not generally transverse, length about 5.5 mm. (North India) *quadrinotatus* Chaud.
- 34(23). Prothorax with short and rather shallow furrows, not quite reaching base, sides not much contracted behind, elytra black, each with two small, pale, apical spots, microsculpture practically isodiametric, length 5-6 mm. (Nilgiri Hills) . . . *guttiger* sp. n.
- 35(22). Base of prothorax unbordered between the furrows, except sometimes by a false border of pores along the margin.
- 36(65). Furrows of prothorax joining marginal channels along base.
- 37(46). Prothorax impunctate, elytra without spots.
- 38(43). Prothorax more than a fourth wider than long, the marginal channels at least moderately wide, length at least 6.5 mm.
- 39(42). Microsculpture of the head isodiametric, elytra black, without iridescence, claw joint of tarsi without setae beneath.
- 40(41). Microsculpture of the head very faint, marginal channels of the prothorax moderately wide and deep, cut off suddenly by an oblique ridge just before base, which is as wide as apex, its margin practically smooth, length 10.5-11 mm. (Bengal, Pegu (*teste* Bates)) *politus* Chaud.
- 41(40). Microsculpture of the head clearly marked, marginal channels of prothorax very wide and deep, disappearing gradually a little before base, which is wider than apex, its margin minutely and irregularly striate, length 7 mm. (Kurseong) . . . *carinifer* sp. n.
- 42(39). Microsculpture of the head formed by transverse lines, elytra black, iridescent, claw joint of tarsi with setae beneath, length 6.5-7 mm. (Central and South India, Ceylon) . . . *promptus* Dej.
- 43(38). Prothorax at most a fourth wider than long, the marginal channels narrow, length at most 6 mm.

² *A. cyclodes* Bates, 1892, *Ann. Soc. ent. Belg.* 1892 : 232, is identical, *syn. n.*

- 44(45). Prothorax a sixth wider than long, its microsculpture formed by somewhat transverse meshes, prosternal process not bordered, elytra black, slightly iridescent, length 5.5-6 mm. (Ceylon, Java, Borneo) *ceylanicus* Nietn.
- 45(44). Prothorax a fourth wider than long, its microsculpture isodiametric, prosternal process bordered, elytra black, not iridescent, length 4-5 mm. (Calcutta) *impunctus* sp. n.
- 46(37). Prothorax punctate between the furrows.
- 47(64). Prothorax with its sides sinuate behind, or with a small, more or less rectangular tooth at hind angles.
- 48(55). Prothorax cyathiform, its base not wider than apex.
- 49(52). Marginal channels of prothorax moderately wide, the furrows meeting the base at a little distance from angles, apical joints of antennae ferruginous, length 8.5 mm.
- 50(51). Base of prothorax as wide as apex, with only a few very fine punctures between the furrows, elytra black, dull, without pale spots (Burma) *sulculatus* Bates.
- 51(50). Base of prothorax much narrower than apex, with numerous fine punctures between the furrows, elytra black, highly iridescent, each sometimes with a pale apical spot (Dacca, Burma (*teste* Bates)) *cyathoderus* Chaud.
- 52(49). Marginal channels of prothorax narrow, the furrows meeting the base practically at the angles, base clearly punctate between the furrows, apical joints of antennae either fuscous or nearly white.
- 53(54). Base of prothorax narrower than apex, hind angles normal, rectangular, elytra black with greenish reflections, each with a shoulder and apical pale spot, apical joints of antennae nearly white, length 4.5-5 mm. (Burma, Indo-China, Java, Sumatra) *quadriguttatus* Chaud.
- 54(53). Base of prothorax as wide as apex, hind angles bidentate, elytra black, suture red, at least near apex, apical joints of antennae fuscous, length 4 mm. (Bombay : Belgaum) . . . *bidentatus* sp. n.
- 55(48). Prothorax not cyathiform, its base not narrower than apex.
- 56(61). Prothorax black, its sides rounded from apex to base, though sometimes straight or vaguely sinuate behind, each hind angle formed by a small, sharp tooth, elytra black or aeneous, without pale spots.
- 57(60). Marginal channels of prothorax not more than moderately wide, puncturation between the furrows very distinct, elytral striae impunctate, legs mainly ferruginous, length not exceeding 5 mm.
- 58(59). Base of prothorax wider than apex, with a false border of pores, basal furrows short but deep, elytra black, striae moderately deep, length 4.5 mm. (Burma) *compactus* sp. n.
- 59(58). Base of prothorax as wide as apex, without a false border, basal furrows short and rather shallow, elytra vaguely aeneous, striae shallow, length 5 mm. (Bombay : Kanara) *belli* sp. n.
- 60(57). Marginal channels of prothorax wide, puncturation between the furrows rather slight, elytra black, striae fairly deep, punctate, legs dark ferruginous, length 6 mm. ("E. Ind.," probably Bombay) *eous* sp. n.
- 61(56). Prothorax dark red, its sides sinuate for some little distance before base, hind angles sharply rectangular, elytra with large pale spots or dark red, length 5.5-6 mm.
- 62(63). Elytra with shallow striae, black, each with two large pale spots, legs flavous (N.E. India) *rubidicollis* Wied.
- 63(62). Elytra with fairly deep striae, dark red, with vague lighter areas near base and apex, legs ferruginous (United Provinces) . . . *borealis* sp. n.

- 64(47). Prothorax with its sides rounded from apex to base, without microsculpture, hind angles obtuse but not much rounded, marginal channels widening a little before base, elytra black, striae moderately deep, impunctate, length 6.5 mm. (South India) . . . *dekkanus* sp. n.
- 65(36). Furrows of prothorax not joining marginal channels along base, sometimes not reaching base, surface impunctate.
- 66(71). Marginal channels of prothorax comparatively wide, elytral striae only indistinctly crenulate, length at least 6 mm.
- 67(68). Prothorax only slightly narrower than elytra, nearly a half wider than long, its sides explanate, the marginal channels distant from the margin, length 7-7.5 mm. (Tenasserim : Houndaran Valley) *foveifrons* Bates.
- 68(67). Prothorax much narrower than elytra, about a fourth wider than long, its sides not explanate, the marginal channels normal, though moderately wide, length 6-6.5 mm.
- 69(70). Head with a deep oblique sulcus on each side between the frontal furrow and the side of the head, base of prothorax wider than apex, elytra black, without iridescence, legs and antennae mainly ferruginous (Assam : Naga Hills) . . . *lucifugus* Andr.
- 70(69). Head without sulcus on each side in front, base of prothorax as wide as apex, elytra black, iridescent, legs and antennae mainly piceous (North and Central India, Siam, Malacca, Sumatra) *haplosternus* Chaud.
- 71(66). Marginal channels of prothorax narrow, elytral striae distinctly though finely punctate, length 5 mm. (South India, Burma) . . . *niger* sp. n.
- 72(21). Metepisterna at least as wide as long, prothorax impunctate, its sides rounded, base unbordered between the furrows, form rather short and more or less oval.
- 73(74). Prosternal process unbordered, metepisterna wider than long, hind angles of prothorax obtuse and rounded, the furrows hardly reaching base, elytra piceous with the sides more or less ferruginous, basal border curving strongly forward on each side to shoulder, length 5-5.25 mm. (Ceylon) . . . *testaceipes* Metch
- 74(73). Prosternal process bordered, elytra black, basal border curving gently forward on each side to shoulder.
- 75(76). Metepisterna as wide as long, eyes prominent, hind angles of prothorax obtuse and rounded, the furrows not quite reaching base, elytra slightly iridescent, striae clearly if finely punctate, at least on basal half, length 5-6 mm. (Upper Rotung—Abor Expedition) . . . *abor* sp. n.
- 76(75). Metepisterna wider than long, eyes rather flat, hind angles of prothorax obtuse but minutely dentate, furrows joining marginal channels along base, elytra not iridescent, striae impunctate, length 5.5 mm. (Rotung—Abor Expedition) . . . *semotus* sp. n.
- 77(20). Frontal furrows sinuate, curving first outwards and then again inwards.
- 78(79). Head with an umbilicate fovea on each side between the furrow and the front margin of the eye, marginal channels of the prothorax moderately wide, narrowing before base, length 5 mm. (Karen Hills) . . . *batesi* Andr.
- 79(78). Head without umbilicate foveae in front, marginal channels of the prothorax very narrow, length not exceeding 4 mm.
- 80(83). Base of prothorax as wide as apex, elytra black, with deep striae, dorsal pores at about middle, microsculpture formed by transverse meshes.
- 81(82). Third joint of antennae and femora ferruginous (S. India, Ceylon, Burma, Federated Malay States, Siam, Indo-China, Java, Sumatra) . . . *pallipes* Chaud.

- 82(81). Third joint of antennae and femora piceous (S. India, Burma)
femoralis Motch.
- 83(80). Base of prothorax wider than apex, elytra ferruginous, with moderately deep striae, dorsal pores a little before middle, microsculpture isodiametric (Burma) *rufulus* Motch.
- 84(19). Frontal furrows extending on each side beyond mid-eye level, to or towards the back of the eye, usually accompanied by a more or less developed external carina.
- 85(86). Base of prothorax bordered between the furrows, head with a well-developed carina on each side, prothorax with short, shallow furrows, joining marginal channels along base, numerous punctures between them, elytra aeneous with large dorsal pores and isodiametric microsculpture, length 5-6 mm. (India, Ceylon, Burma)
antiquus Dej.
- 86(85). Base of prothorax not bordered between the furrows, except sometimes by a false border of pores.
- 87(112). Prothorax with its furrows evidently joining marginal channels along base.
- 88 (89). Prothorax impunctate between the furrows, which are short and shallow, elytra black or piceous, somewhat iridescent, length 5-6 mm. (S. India, Ceylon) *rufopiceus* Nietn.
- 89 (88). Prothorax punctate between the furrows.
- 90(103). Prothorax with its sides moderately or gently rounded in front, straight or sinuate behind, the furrows meeting the base on each side at a little distance from hind angles, base wider than apex.
- 91(102). Prothorax subcordate, hind angles sharp and evident, distinctly if sometimes sparsely punctate between the furrows, microsculpture of the elytra isodiametric, dorsal pores before middle, length nearly always over 5 mm.
- 92 (97). Hind angles of prothorax each in the form of a fairly large tooth, projecting more or less laterally.
- 93 (96). Microsculpture of the head and prothorax distinct, hind angles of prothorax not projecting far laterally, the emargination in front of them not rectangular.
- 94 (95). Furrows a fourth as long as prothorax, the space between them finely and densely punctate, elytra bright aeneous, legs mainly ferruginous, length 5.5-6.5 mm. (Burma) *picipes* Motch.
- 95 (94). Furrows a third as long as prothorax, the space between them moderately punctate, elytra dark aeneous, legs piceous, length 6 mm. (India) *artus* sp. n.
- 96 (93). Microsculpture of the head and prothorax obsolete, hind angles of the prothorax projecting far laterally, the emargination in front of them rectangular, elytra dark aeneous, legs ferruginous, length 5-6 mm. (Burma, Sumatra) *politulus* Chaud.
- 97 (92). Hind angles of prothorax each in the form of a small rectangular tooth, hardly projecting laterally.
- 98 (99). Prothorax about a fourth wider than long, elytra black with an aeneous sheen, striae fine, interval 3 wider than 4, length 5.5 mm. (Manipur) *vitreus* sp. n.
- 99 (98). Prothorax about a third wider than long, elytra aeneous, striae moderately impressed, interval 3 as wide as 4.
- 100(101). Head finely transversely striate, elytral striae shallower near apex, outer intervals flat, legs flavous, length 5.25 mm. (Almora)
luteipes sp. n.

- 101(100). Head not transversely striate, elytral striae hardly shallower near apex, outer intervals convex, legs dark ferruginous, femora piceous, length 5-7 mm. (India, Ceylon, Burma, Siam, Indo-China) *submetallicus* Nietn.
- 102 (91). Prothorax subquadrate, hind angles sharp but inconspicuous, with only one or two very fine punctures between the furrows, elytra black, their microsculpture formed by very wide meshes, dorsal pores at three-fifths from base, length 4.5-5 mm. (South Burma, Indo-China) *quadricollis* Chaud.
- 103 (90). Prothorax either cyathiform, or with its sides rounded from apex to base, furrows meeting base on each side practically at hind angles, base not wider than apex, elytra black.
- 104(107). Prothorax cyathiform, its hind angles bidentate (*i.e.* each with a projecting tooth in front of the normal angle), upper surface without microsculpture, except on apical half of elytra.
- 105(106). Furrows of prothorax rather lightly impressed, a deep transverse impression across base, with some transverse striation in front of it, elytral striae deep, length 7 mm. (Madras) *cycloderus* sp. n.
- 106(105). Furrows of prothorax very lightly impressed, a moderate impression across base, without transverse striation, elytral striae only moderately deep, length 4.5 mm. (United Provinces, Madras) *candidus* sp. n.
- 107(104). Prothorax with its sides rounded from apex to base, hind angles each in the form of a very small, sharp tooth, the furrows very fine, elytra with microsculpture.
- 108(111). Microsculpture of the elytra isodiametric.
- 109(110). Prothorax finely and fairly closely punctate, elytra dull, striae very lightly impressed, intervals flat, length 4.5 mm. (India) *blandus* sp. n.
- 110(109). Prothorax very finely and sparsely punctate, elytra shiny, striae moderately impressed, intervals convex, length 4.5 mm. (Ceylon) *dejeani* Nietn.
- 111(108). Microsculpture of the elytra formed by fine transverse lines (India, Ceylon) *bipunctatus* Motch.
- 112 (87). Prothorax with its furrows either not joining marginal channels along base, or joining them by an extremely fine groove.
- 113(120). Furrows of prothorax not joining marginal channels.
- 114(115). Prothorax impunctate, marginal channels fairly wide, elytra piceous, striae clearly punctate on basal half, the setae on apical ventrite arising from foveae in both sexes, length 4.75-6 mm. (India, Burma) *hirmocoelus* Chaud.
- 115(114). Prothorax punctate between the furrows, marginal channels rather narrow, the setae on apical ventrite arising from pores, antennal joint 3 pilose on apical half, dorsal pores of elytra at about a third from apex, claw joint of tarsi with at least some setae beneath.
- 116(117). Prothorax with numerous fine punctures between the furrows and impunctate elsewhere, median line deeper at base, elytra black, microsculpture of upper surface obsolete, length 6 mm. (Bihar) *disjunctus* sp. n.
- 117(116). Prothorax either with comparatively few fine punctures between the furrows, or punctate throughout, median line not deeper at base, upper surface mainly dark red.
- 118(119). Prothorax impunctate, except for some fine punctures between the furrows, base a little narrower than apex, elytra with a black patch on disk, microsculpture isodiametric, striae fine and finely crenulate, length 4.5-5 mm. (Central and South India, Burma) *dorsalis* Motch.

- 119(118). Prothorax punctate both above and beneath, base quite as wide as apex, elytra red, microsculpture obsolete on disk, striae moderately impressed, finely punctate, length 4.5 mm. (N.E. India) *rufotestaceus* Chaud.
- 120(113). Furrows of prothorax joining marginal channels along base by an extremely fine groove, elytra black, vaguely aeneous, striae moderately impressed, impunctate, dorsal pores at two-fifths from base, length 4.75 mm. (Kumaon) *optatus* sp. n.

***Abacetus silvanus* sp. n.**

Length, 10 mm.

Black, shiny; palpi and apical joints of antennae piceous.

Head with the furrows very short but moderately deep, curving sharply outwards behind, but not reaching eyes. *Prothorax* four-fifths wider than head, two-fifths wider than long, base rather wider than apex, marginal channels narrowing behind; furrows a third as long as prothorax, not quite reaching base. *Elytra* suboval, though with nearly parallel sides, a fourth wider than prothorax, three-fifths longer than wide; striae moderately deep, intervals a little convex. Microsculpture consisting of extremely fine lines, forming hardly visible meshes, nearly isodiametric on head and prothorax, a little transverse on elytra.

UNITED PROVINCES: Dehra Dun, Dhobalwala (*A. K. Sharma*), 1 ♀, and "Dehra Dun," 1 ♀ (in poor condition), both Forest Res. Inst., Dehra Dun.

***Abacetus guttiger* sp. n.**

Length, 5-6 mm.

Black, shiny; palpi, joints 1 to 4 of antennae (rest brown), and legs ferruginous; elytra each with a small, reddish spot on interval 7 close to shoulder, and two elongate, pale spots near apex on intervals 5 and 7 (sometimes also on 6, 8, and 9), apical border also pale, the colour here sometimes joining the spots.

Head with the furrows moderately deep, curving sharply outwards behind and reaching the front supraorbitals. *Prothorax* three-fourths wider than head, two-fifths wider than long, base evidently wider than apex, sides rounded from apex to base, hind angles slightly obtuse, each with a minute tooth, base finely punctate between the furrows. *Elytra* oval, a third wider than prothorax, not quite a third longer than wide; striae moderately deep, impunctate, intervals a little convex, 3 to 6 slightly wider than the rest, dorsal pores at about middle.

MADRAS: Nilgiri Hills (*H. L. Andrewes*), 14 ex. ♂♀, my collection; Mangalore (*J. C. M. Gardner*), 1200 feet, 1 ♀, For. Res. Inst., Dehra Dun. MYSORE: Anantapur (*E. A. Glennie*), 1 ♀, For. Res. Inst.; "S. Mysore" (*H. L. Andrewes*), 1 ♀, my collection.

***Abacetus carinifer* sp. n.**

Length, 7 mm.

Black, shiny; palpi, joint 1 of antennae (rest missing), and legs ferruginous.

Head with short, deep furrows, curving sharply outwards and almost joining front supraorbitals, clypeus bordered. *Prothorax* two-thirds wider than head, a half wider than long, sides well rounded, sinuate a little before base, hind angles sharp though slightly obtuse; furrows rather narrow, a third as long as prothorax, converging in front. *Elytra* ovate, a fourth wider than prothorax, nearly two-thirds longer than wide, striae moderately

deep, impunctate, intervals only slightly convex, dorsal pores small, well behind middle. Microsculpture of prothorax and elytra formed by transverse lines.

SIKKIM : Kurseong, 1 ♀, my collection.

Abacetus impunctus sp. n.

Length, 4.5 mm.

Black, shiny ; palpi, joints 1 to 3 of antennae, and legs ferruginous.

Head with short, fairly deep, nearly straight furrows, diverging behind, but not nearly reaching eyes, clypeal pores well behind the front angles. *Prothorax* a third wider than head, base as wide as apex, sides well rounded, sinuate a little before base, hind angles sharp, slightly obtuse ; furrows narrow, parallel, rather shallow, a third as long as prothorax. *Elytra* with parallel sides and square shoulders, not quite a half wider than prothorax and not quite a half longer than wide, striae rather deep, impunctate, intervals convex, dorsal pores just behind middle, a microsculpture of wide meshes.

BENGAL : Calcutta (*S. W. Kemp and Ribeiro*), 1 ♂, 1 ♀, "at light," Ind. Mus.

Abacetus bidentatus sp. n.

Length, 4 mm.

Black, shiny, suture of elytra red near apex ; palpi, joints 1 to 3 of antennae, and legs dark ferruginous.

Head with short, moderately deep furrows, extending first outwards and then again inwards, clypeus bordered. *Prothorax* a third wider than head, a fourth wider than long, base with a false border of pores, hind angles sharp, but slightly obtuse, each with a projecting tooth in front of the normal angle ; furrows narrow, parallel, about a third as long as prothorax. *Elytra* with parallel sides, a third wider than prothorax, rather less than a half longer than wide, striae moderately impressed, impunctate, intervals a little convex, dorsal pores a little before middle. Microsculpture of the head isodiametric, that on prothorax barely visible, the elytra with very wide meshes.

BOMBAY : Belgaum (*H. E. Andrewes*), 1886, 3 ♂, 1 ♀, my collection.

Abacetus compactus sp. n.

Length, 4.5 mm.

Black, shiny ; palpi, antennae, legs, and apex of elytra ferruginous.

Head with short, moderately deep furrows, diverging behind, extending to clypeus, but not reaching eyes. *Prothorax* three-fifths wider than head, a fourth wider than long, sides slightly sinuate before the dentiform hind angles ; furrows converging forwards, about a third as long as prothorax. *Elytra* ovate, a fourth wider than prothorax, three-fifths longer than wide, striae moderately deep, intervals somewhat convex, dorsal pores just behind middle. Microsculpture of the head isodiametric, that of the prothorax and elytra formed by transverse lines.

BURMA : Putao district, Sumprabum (*B. Fischer*), iv-v.1925, 1 ♂, British Museum.

Abacetus belli sp. n.

Length, 5 mm.

Black, shiny, elytra with a vague aeneous tinge ; palpi, joint 1 of antennae (rest missing), legs, and apical border of elytra ferruginous.

Head with shallow, nearly straight furrows, diverging behind, extending to clypeus, but not reaching eyes, clypeus bordered. *Prothorax* not quite a half wider than head, not quite a fourth wider than long, sides straight behind; furrows nearly parallel, about a fifth as long as prothorax, the punctures between them, though distinct, not numerous. *Elytra* ovate, two-fifths wider than prothorax, rather more than a half longer than wide, striae impunctate, intervals slightly convex, dorsal pores placed well before middle. Microsculpture hardly visible on head or prothorax; on the elytra there are slightly transverse meshes.

BOMBAY : North Kanara (*T. R. D. Bell*), 1 ♀, my collection.

***Abacetus eous* sp. n.**

Length, 6 mm.

Black, shiny; palpi ferruginous, joint 1 of antennae (rest fuscous), and legs dark ferruginous.

Head small; with the furrows short, moderately deep, curving outwards, extending to clypeus, but not reaching eyes, clypeus bordered. *Prothorax* twice as wide as head, rather more than a fourth wider than long, base wider than apex, sides straight behind; furrows nearly parallel, moderately impressed, rather narrow, about a third as long as prothorax, *Elytra* somewhat flat, sides nearly parallel, not much wider than prothorax, nearly three-fourths longer than wide; striae evidently, though finely punctate, intervals rather convex, dorsal pores well behind middle. Microsculpture of head isodiametric, that of prothorax and elytra formed by transverse lines. Metepisterna about a third longer than wide.

"E. Ind.," 1 ♀, British Museum. A note in the Museum register reads :— "Most of these Mr. Woolley (from whom they were purchased) told me were collected in the Bombay district."

***Abacetus borealis* sp. n.**

Length, 5.5–6 mm.

Dark red, with vague indications of lighter areas near base and apex of the elytra, the palpi and base of antennae also a little lighter, legs ferruginous.

Head with the furrows short but deep, curving outwards behind and continued as fine lines to front supraorbitals. *Prothorax* fully a half wider than head, a fourth wider than long, base barely wider than apex; furrows deep, not quite a third as long as prothorax, numerous punctures between them. *Elytra* rather flat, with nearly parallel sides, a fourth wider than prothorax, a little more than a half longer than wide; striae moderately deep, vaguely crenulate, a little shallower at sides, intervals slightly convex, dorsal pores rather behind middle. Microsculpture of the head isodiametric; prothorax and elytra with fine, transverse meshes. Claw joint of tarsi practically glabrous beneath, though under the microscope one or two minute setae can be detected.

UNITED PROVINCES : Dehra Dun, Cujrara, 1 ♂ (type), my collection; Kumaon, Khairna, 2 ♂, 3 ♀, For. Res. Inst.; Haldwani, 1 ♂, 1 ♀, and West Almora, 1 ♂ (*H. G. Champion*).

***Abacetus dekkanus* sp. n.**

Length, 6.5 mm.

Black, very shiny; palpi, joints 1 to 3 of antennae, and legs ferruginous.

Head with the furrows short, moderately deep, curving outwards behind and reaching front supraorbitals. *Prothorax* four-fifths wider than head, two-fifths wider than long,

base evidently wider than apex; furrows fairly deep, a third as long as prothorax, base between them finely punctate. *Elytra* oval, a sixth wider than prothorax, three-fifths longer than wide, intervals slightly convex, 3 and 5 a little wider than the others, dorsal pores just behind middle. Microsculpture isodiametric on the head; on the elytra there are meshes averaging twice as wide as long. Claw joint of tarsi slightly setulose beneath.

BOMBAY: Belgaum district, Nagargali, 1 ♂ (type), and Parle, 1 ♂ (*H. E. Andrewes*), my collection; Castle Rock (*Y. R. Rao*), 1 ♂, Agric. Res. Inst., Pusa. MYSORE: Shimoga, Sagar, 1 ♂, Indian Museum.

Abacetus niger sp. n.

Length, 5 mm.

Black, shiny, somewhat iridescent; palpi, antennae, and legs ferruginous.

Head with short, fairly deep furrows, diverging behind, extending to clypeus, but not to eyes, clypeus bordered. *Prothorax* a half wider than head, a fourth wider than long, base wider than apex; furrows fairly deep, barely reaching base, converging in front, rather more than a third as long as prothorax. *Elytra* ovate, a fourth wider than prothorax, rather more than a half longer than wider, striae moderately impressed, lightly punctate, intervals somewhat convex, dorsal pores behind middle. Microsculpture of head isodiametric, that of prothorax and elytra formed by transverse lines. Metepisterna about a third longer than wide.

"India" (Bowring Coll.), 1 ♀ (type), British Museum. MADRAS: Kodai-kanal (*Castets*), 1 ♂, my collection. BURMA: Manipur (*T. B. Fletcher*), 1 ♀, Agric. Res. Inst. Pusa. The type differs a little from the other two specimens, which, however, agree very nearly with it.

Abacetus abor sp. n.

Length, 5-6 mm.

Black, shiny, faintly iridescent; palpi, antennae, legs, and borders of prothorax and elytra ferruginous.

Head with short, deep furrows, not extending to clypeus, but reaching front supra-orbitals on each side by a shallow groove, a depression on each side between furrow and base of mandible, clypeus bordered. *Prothorax* nearly three-quarters wider than head, fully a third wider than long, base unbordered between the furrows, wider than apex, sides strongly rounded from apex to base, with fairly narrow marginal channels; furrows narrow, parallel, shallow, about a third as long as prothorax, surface impunctate. *Elytra* convex, short ovate, about a fifth wider than prothorax, a fourth longer than wide, striae rather deep, intervals moderately convex, the inner much wider than the outer ones, dorsal pores at about two-fifths from apex.

ABOR EXPEDITION: near Parong (*S. W. Kemp*), 2200 feet, 27.i.1912, 1 ♂ (type); Upper Rotung (*S. W. Kemp*), 2000 feet, 7.i.1912, 1 ♀, Indian Museum.

Abacetus semotus sp. n.

Length, 5.5 mm.

Black, shiny; palpi, antennae, and legs ferruginous.

Apart from the characters mentioned in the key, this species differs from *A. abor* in being rather less short and compact, the sides of the body less rounded, the frontal furrows shallower, the depressions at sides in front obsolete, the marginal channels of the prothorax narrower, the furrows similar but a little shorter, the striae of the elytra rather shallow, the intervals only slightly convex, no dorsal pores.

ABOR EXPEDITION : near Kalek (*S. W. Kemp*), 2500 feet, 15.iii.1912, 1 ♂ (type); Rotung to Kalek (*S. W. Kemp*), 2000–3500 feet, 14–15.iii.1912, 1 ♀, Indian Museum.

***Abacetus artus* sp. n.**

Length, 6 mm.

Dark aeneous, shiny; palpi and joints 1 and 2 of antennae (rest missing) ferruginous, legs piceous.

Head with the furrows short and deep in front, extending to clypeus, continued behind towards back of eye and bounded externally by a carina, clypeal suture very distinct. *Prothorax* a half wider than head, not quite a third wider than long, base with a false border of minute pores, slightly wider than apex; furrows fairly deep, converging slightly in front. *Elytra* with parallel sides, not much wider than prothorax, nearly twice as long as wide, striae rather shallow, finely though evidently crenulate, intervals nearly flat, dorsal pores just before middle. Microsculpture of head and elytra isodiametric, that of prothorax formed by somewhat transverse meshes. Metepisterna about a third longer than wide.

“INDIA” (Nevinson Coll.), 1 ♂, British Museum.

***Abacetus vitreus* sp. n.**

Length, 5.5 mm.

Black, elytra with a faint aeneous sheen, very shiny; palpi (at base and apex), joints 1 and 2 of antennae (rest fuscous), and legs (except base and apex of femora and tibiae) ferruginous.

Head with rather shallow furrows, extending to clypeus, widening out gently behind to back of eye and bounded by a fine outer carina. *Prothorax* cordate, a half wider than head, base with a false border of minute pores, marginal channels very narrow; furrows less than a third as long as prothorax, fairly deep, evidently converging in front. *Elytra* with nearly parallel sides, a fourth wider than prothorax, three-fourths longer than wide, striae fine and very finely crenulate, intervals flat, dorsal pores well before middle. Microsculpture of head and elytra isodiametric, that of prothorax formed by wide meshes.

BURMA : Manipur (*S. N. Chatterjee*), 2578 feet, 20.iii.1924, 1 ♀, For. Res. Inst., Dehra Dun.

***Abacetus luteipes* sp. n.**

Length, 5.25 mm.

Aeneous, shiny; palpi, antennae (apical joints missing), legs, and apical border of elytra flavous.

Head with rather shallow furrows, extending to clypeus, widening out behind to back of eye and bounded by a well-marked outer carina, clypeus depressed in front. *Prothorax* cordate, a half wider than head, about a fifth wider than long, base with a false border of minute pores, marginal channels narrow; furrows less than a third as long as prothorax, moderately deep, converging in front, the area between them densely punctate. *Elytra* with nearly parallel sides, quite a third wider than prothorax, rather more than a half longer than wide, striae fine, impunctate, intervals flat, dorsal pores rather conspicuous, at about a third from base. Microsculpture of head and elytra isodiametric, that of prothorax formed by transverse lines.

UNITED PROVINCES : Almora, Kosi River (*J. C. M. Gardner*), 30.v.1937, 1 ♀, For. Res. Inst., Dehra Dun.

***Abacetus cycloderus* sp. n.**

Length, 7 mm.

Black, shiny; palpi, joints 1 to 3 of antennae (rest missing), and legs dark ferruginous.

Head with the furrows moderately deep in front, extending to clypeus, widening out behind to back of eye, with a rather vague external ridge, clypeus depressed in front, the suture very distinct. *Prothorax* very convex, about three-fifths wider than head, a fifth wider than long, base narrower than apex, marginal channels narrow; median line obsolete, except near base, furrows not deeper than its basal part, about a fourth as long as prothorax, converging a little in front. *Elytra* with parallel sides, very little wider than prothorax, four-fifths longer than wide, striae fairly deep, impunctate, intervals convex, dorsal pores rather behind middle.

MADRAS (*F. H. Gravely*), 1 ♀.

***Abacetus candidus* sp. n.**

Length, 4.5 mm.

Black, shiny; joints 1 to 4 of antennae (rest missing), and legs ferruginous.

Head with the furrows only moderately impressed in front, extending to clypeus, widening out behind to back of eye and bounded by an external carina, clypeal suture well marked. *Prothorax* very convex, a half wider than head, a fourth wider than long, base narrower than apex, marginal channels narrow; median line extremely fine in front, deeper behind, the furrows not any deeper, barely a fourth as long as prothorax, converging slightly in front. *Elytra* with parallel sides, about a fourth wider than prothorax, three-fifths longer than wide, striae moderately impressed, impunctate, dorsal pores a little behind middle.

UNITED PROVINCES: Dehra Dun (*A. K. Sharma*), 9.xii.1928, 1 ♀ (type), "ex dung." MADRAS: Arcot (*E. A. Glennie*), 1 ♀, both For. Res. Inst., Dehra Dun.

***Abacetus blandus* sp. n.**

Length, 4.5 mm.

Black, shiny, elytra dull; palpi and legs ferruginous, antennae dark ferruginous to piceous.

Head with the furrows only moderately impressed in front, not extending to clypeus, widening out behind to back of eye and bounded by an external carina, antennae dilated, apical joints flattened, each with a median sulcus. *Prothorax* convex, a little more than a third wider than head, not much wider than long, marginal channels fairly narrow; median line fine, a little deeper near base, where it is as deep as the furrows, which are short, though indicated vaguely as far as middle, converging only slightly in front, disk with slight cross-striation. *Elytra* with parallel sides, a little more than a half wider than prothorax, two-fifths longer than wide, striae fine, finer towards apex, very clean cut, impunctate, intervals flat, dorsal pores just behind middle. Microsculpture of the elytra isodiametric and conspicuous; head and prothorax without microsculpture on disk, but finely and sparsely punctate.

BENGAL: Calcutta, 1 ♂, 1 ♀, British Museum. CENTRAL PROVINCES: Seoni district, Khawasa (*E. A. D'Abreu*), 2000 feet, 17.i.1917, 1 ♀ (type), my collection.

***Abacetus disjunctus* sp. n.**

Length, 6 mm.

Black, shiny; palpi, joint 1 of antennae, tarsi, and apical border of elytra dark ferruginous.

Head with the furrows moderately deep in front, extending to clypeus, widening out behind to back of eye, with a rather vague outer ridge, clypeus depressed in front. *Prothorax* cordate, not quite a half wider than head, a fourth wider than long, base slightly wider than apex, hind angles each in the form of a small rectangular tooth; furrows fairly deep, about a third as long as prothorax, converging a little in front. *Elytra* rather flat, with nearly parallel sides, a little more than a half wider than prothorax, two-fifths longer than wide, striae moderately deep, crenulate, intervals rather convex. Venter finely, though not closely, punctate and setulose.

BIHAR : Pusa, iii.1909, 1 ♂, Agric. Res. Inst., Pusa.

Abacetus optatus sp. n.

Length, 4.75 mm.

Black, vaguely aeneous, shiny; palpi (at base and apex), joints 1 and 2 of antennae, and legs ferruginous.

Head with uneven, moderately deep furrows, extending to clypeus, diverging behind and reaching hind supraorbitals, with an outer ridge. *Prothorax* cordate, two-fifths wider than head, a fourth wider than long, base with a false border of pores, wider than apex, marginal channels narrow, hind angles sharp, rectangular; furrows fairly deep, barely a third as long as prothorax, evidently converging in front. *Elytra* subovate, a third wider than prothorax, rather more than a half longer than wide, intervals slightly convex.

KUMAON : Ranikhet (*H. G. Champion*), 1 ♂.

Abacetus illuminans Bates.

Colours as given by Bates, but the elytra are only faintly aeneous and very slightly iridescent, joints 1 and 2 of the antennae pale. Head smooth, furrows very short, ending opposite middle of eyes. Prothorax convex, quite two-thirds wider than head, a half wider than long, base truncate, hind angles fairly sharp but slightly obtuse; median line fine and faint, basal furrows moderately deep, straight, converging slightly in front, a fourth as long as prothorax, but traceable to a half. Elytra convex, a fourth wider than prothorax, rather less than a half longer than wide, border forming a very obtuse angle at shoulder; striae moderately deep and clearly cut, impunctate, deep near apex; intervals slightly convex on disk, convex near apex, dorsal pores at two-thirds from base, surface impunctate. Microsculpture formed by fine lines, hardly making meshes on the elytra, the meshes very wide on the prothorax, slightly wider than long on the head.

Abacetus sulcatus Bates.

Colours as given by Bates. Head with the furrows short and deep, curving sharply outwards, but only reaching half-way to eye. Prothorax convex, cordate, three-fifths wider than head, a half wider than long, base truncate at middle, a little oblique at sides, which are moderately reflexed, sinuate quite close to base; median line fine in front, deep near base, furrows very deep, straight, converging slightly in front, two-fifths as long as prothorax. Elytra convex, just wider than prothorax, quite three-fifths longer than wide, border forming only a vague angle at shoulder; striae moderately deep, impunctate, intervals moderately convex, dorsal pores just behind middle, surface impunctate. Microsculpture almost isodiametric on the elytra, the meshes slightly wider than long; prothorax with very wide meshes; head with the meshes isodiametric, but hardly visible on the disk. The type is a ♀.

The general form is that of *politus* and *cordicollis*.

Abacetus foveifrons Bates.

Colours as given by Bates. Head small, smooth, eyes prominent, antennae not extending far beyond base of elytra, furrows deep, an oblique line extending on each side a third of the way towards eye. Prothorax convex, cordate, three-fourths wider than head, base truncate, unbordered, wider than apex, sides rounded, reflexed, more widely behind, hind angles obtuse, but minutely denticulate owing to the pore on the border; median line fine and faint, furrows deep, straight, converging a little in front, nearly half as long as prothorax (the form of the prothorax is similar to that of *hirmocoelus* on a large scale). Elytra convex, exactly a seventh wider than prothorax, two-fifths longer than wide, border forming a distinct though slightly obtuse angle at shoulder; striae indistinctly crenulate, as is the marginal channel, intervals moderately convex, dorsal pores at two-thirds from base, surface impunctate. Microsculpture as in *illuminans*, but the meshes on the head are isodiametric. Metatarsal joints with a slight external sulcus and carina. Protibial spur simple.

ON A FEW COCCIDAE (HOMOPT.) RECENTLY DESCRIBED
FROM MAURITIUS

By Raymond MAMET.

Chrysomphalus alluaudi Mamet.1936, *Proc. R. ent. Soc. Lond.* (B) 5 : 93, fig. 3.

Typical individuals of this species were forwarded to Prof. G. F. Ferris, who kindly examined them with the collaboration of Mr. H. L. McKenzie. The latter, in his remarkable review (1939, *Microentomology* 4 : 51-77) of the genus *Chrysomphalus* Ashmead, has relegated (*loc. cit.* : 53) this species to *Clavaspis* MacGillivray. Prof. Ferris, on the other hand, expresses the opinion (*in litt.*) that *Chrysomphalus alluaudi* is the same as *Clavaspis herculeana* (Doane & Hadden). I have come to the same conclusion after examining the type in comparison with the excellent figure which Prof. Ferris published in 1938, *Atlas of the Scale Insects of North America* 2 : (206). *Chrysomphalus alluaudi* Mamet should therefore be sunk as a synonym of *Clavaspis herculeana* (Doane & Hadden) **syn. n.**

Chrysomphalus castigatus Mamet.1936, *Proc. R. ent. Soc. Lond.* (B) 5 : 94, fig. 4.

I am in complete agreement with Mr. H. L. McKenzie, who examined typical individuals of my *Chrysomphalus castigatus*, in sinking (1939, *Microentomology* 4 : 58) this species as a synonym of *Chrys. dictyospermi* (Morgan) in his revision of the genus *Chrysomphalus* Ashmead.

PROC. R. ENT. SOC. LOND. (B) 11. PT. 2. (FEB. 1942.)

Aspidiotus subterraneus Mamet.

1939, *Trans. R. ent. Soc. Lond.* 89 : 580, fig. 2.

I am informed by Mr. E. E. Green that the name *Aspidiotus subterraneus* under which I described a Coccid from Mauritius is preoccupied for another species created by Lindinger. In these circumstances, I propose *zingiberi* to take the place of the preoccupied *subterraneus*.

Moreover, I am convinced, after re-examination of the type, that this species does not belong to the genus *Aspidiotus* Bouché, but to *Aspidiella* Leonardi. *Aspidiotus subterraneus* Mamet should therefore be known as *Aspidiella zingiberi* nom. n.

Length of adult female, 1.2-1.5 mm.; breadth of same, 1.0-1.3 mm.

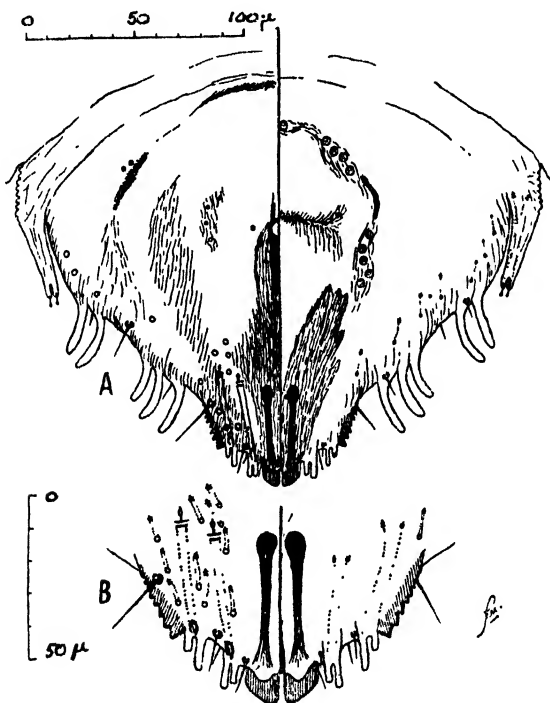


FIG. 1.—*Lepidosaphes mimusopis* Mamet, the genotype of *Mimusapis* gen. n.—
A, pygidium of adult female; B, apex of pygidium of adult female.

Lepidosaphes mimusopis Mamet.

1939, *Trans. R. ent. Soc. Lond.* 89 : 581, fig. 3.

On re-examining the type slides of this species, I have found that small, oval pores with fairly long tubular ducts are present on the margin of the apex of the pygidium of the adult female. A new figure (fig. 1) indicates their position.

This oversight can be accounted for, since the individuals on which I based my description were not sufficiently and clearly stained by the Ziehl-Neelsen Carbol Fuchsin I used. I have been able to recognise the presence of these pores when I stained other individuals from the same type lot by the method recommended by Gage (1919, *Ent. News* 30 : 142-143) and MacGillivray (1921, *The Coccidae* : 19-20).

Furthermore, I am now of opinion that this species, which I provisionally assigned to the genus *Lepidosaphes* Shimer, should no longer remain in that genus. I have recently collected a closely related species (to be described shortly) which has strengthened my views about the erection of a new genus for *mimusopis*. This I do now.

Mimusaspis gen. n.

DIASPINAE with "two-barred ducts."

Small dorsal pores with narrow tubular ducts present on the submarginal areas of metathorax and of all abdominal segments. Few dorsal macropores with fairly long ducts on margin of sixth and seventh segments of abdomen. Median pygidial trullae close together but non-zygotic, without any squames between them. Second pair of trullae obsolete, represented (in genotype) by a sclerotised serrated incassation of margin of pygidium. Squames simple. Perivulvar pores in five small groups. Paraphyses present opposite median trullae.

Female puparium elongate; exuviae terminal.

Male puparium more or less similar in form to that of adult female; exuvium terminal.

Genotype :—*Lepidosaphes mimusopis* Mamet.

Somewhat related to *Andaspis* MacGillivray.

Lepidosaphes vinsoni Mamet.

1940, *Proc. R. ent. Soc. Lond.* (B) 9 : 71, fig. 4, h-j.

The lettering of drawings *j* and *h* of figure 4 are erroneous and should be transposed.

Tylococcus mauritiensis Mamet.

1939, *Trans. R. ent. Soc. Lond.* 89 : 579, fig. 1.

Through an oversight the dimensions of this species were not given. These should be reckoned as follows :—

Length, 1.3-2.1 mm.; breadth, 0.8-1.7 mm.

A SYNOPSIS OF THE OLD WORLD SPECIES OF *MURMIDIUS* LEACH (COLEOPTERA, COLYDIIDAE)

By H. E. HINTON, Ph.D., F.R.E.S.

(Department of Entomology, British Museum (Natural History)).

In this paper three new species of *Murmidius* are described, one from Rhodesia and two from Singapore. Of the seven species which have already been described five are neotropical, one, *M. ovalis* (Beck), is cosmopolitan, and one, *M. segregatus* Waterhouse, has been recorded only from Rodriguez Island. A key is given to all the Old World species, *M. ovalis* and *M. segregatus* are redescribed, and the latter is recorded for the first time in Ceylon, Malaya, and England.

A key to the Old World species of *Murmidius*.

1. Pronotum without lateral longitudinal sulci; only rarely with feebly developed submedian sulci. Elytra confusedly punctate, never with punctures arranged in rows. Prosternum with median carinae diverging anteriorly, particularly near apex; when only feebly diverging anteriorly they are confined to basal third or fourth 2.
- Pronotum always with distinct lateral longitudinal sulci; usually with well-developed submedian sulci. Elytra with punctures arranged in distinct rows. Prosternum with median carinae always parallel and present on basal two-thirds 4.
2. Pronotum with apical marginal line confined to border of antennal cavities. Prosternum with median carinae present on basal three-fourths to four-fifths and near apex suddenly and strongly diverging. Mesosternum without a marginal line on middle of apex; sides with marginal line complete and distinct. Marginal line in front of hind femoral cavity absent or very short, indistinct, and not extending more than a fourth of distance to episternum. Rodriguez Is., Malaya, Ceylon, England
M. segregatus Waterhouse.
- Pronotum with apical marginal line extending towards middle on each side to a point beyond mesal margin of eye. Prosternum with median carinae confined to basal third or fourth and near apex not suddenly and strongly diverging. Mesosternum with apical marginal line complete and distinct; sides not margined. Marginal line in front of hind femoral cavity complete to metasternal episternum 3.
3. Dorsal surface moderately dark rufo-piceous. Pronotum with some punctures near antennal cavities a third coarser than those of disk. Prosternum with median carinae rather inconspicuous and present on basal third. Sides of metasternum with punctures more or less uniform in size, without a group of coarse punctures. Singapore . . . *M. stolicus* sp. n.
- Dorsal surface black to occasionally very dark rufo-piceous. Pronotum with punctures near antennal cavities never distinctly coarser than those of disk. Prosternum with median carinae moderately prominent and confined to basal fourth. Sides of metasternum with eight to twelve conspicuous, round, coarse punctures among fine ones. N. Rhodesia
M. hebrus sp. n.
4. Body more or less parallel. Elytra with serial punctures of basal half of disk oval to elongate (one and a half to two times as long as broad). Mesosternum with apex completely margined though very finely so at middle. Singapore *M. tydeus* sp. n.

- . Body broadly oval to feebly obovate. Elytra with serial punctures of basal half of disk round. Mesosternum with middle of apex not margined.
Cosmopolitan *M. ovalis* (Beck).

Murmidius segregatus Waterhouse.

1876. *Murmidius segregatus* Waterhouse, *Ann. Mag. nat. Hist.* (4) 18: 114.

Length, 1.17-1.37 mm.; breadth, 0.73-0.95 mm. Body broadly oval and moderately strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), suberect to recumbent, pale hairs. Cuticle strongly shining and moderately dark brownish-piceous (occasionally rufo-piceous); antennae and legs paler brownish-piceous to brownish-testaceous. *Head* above eyes finely margined; surface with microscopic punctures (about one-half as coarse as facets of eyes or less) which are separated by one and a half to three or even four diameters; surface between punctures smooth. Clypeus with fronto-clypeal suture very finely, shallowly impressed but distinct and complete; anterior margin very broadly and feebly rounded; surface with punctures like head but near anterior margin with punctures slightly coarser and much denser. *Pronotum* with broadest point, which is across base, twice as broad as long (0.54 mm.: 0.24 mm.), base broader than apex between antennal cavities (0.54 mm.: 0.35 mm.), and apex between antennal cavities six times as broad as an antennal cavity (0.35 mm.: 0.05 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side; apex bordering antennal cavities margined like sides, this marginal line not extending even for a short distance along apex towards middle. Surface without trace of lateral sulci and only rarely with short, indistinct, submedian sulci; disk with punctures as coarse as, or very slightly coarser than, those of head and separated by one and a half to two diameters; along anterior margin with a single, rather irregular row of shallow, round to oval punctures which are as coarse as or slightly coarser than facets of eyes; on each side near antennal cavity with a moderately dense group of 9-15 similar coarse punctures; on each side about half-way to antennal cavity two or three coarse punctures extend posteriorly from apical margin and are sometimes more or less joined together to form a submedian sulcus; surface between all punctures smooth. *Elytra* three times as long as pronotum (0.84 mm.: 0.24 mm.). Near humeri with a moderately broad gibbous area. Surface confusedly punctate, without trace of serial punctures; punctures on an oval discal area near base sparser and finer than those of head; near apex and near sides with similar sparse punctures; elytra elsewhere with punctures slightly but distinctly coarser than those of pronotal disk and separated usually by one and a half to two diameters; surface between elytral punctures usually smooth but occasionally with a scarcely visible alutaceous microsculpture. *Prosternum* with median carinae present on basal three-fourths to four-fifths, moderately prominent, and feebly diverging anteriorly but near apex suddenly and strongly diverging anteriorly; carina in front of anterior coxa about as prominent as median carina and extending obliquely outwards in an almost straight line to near anterior margin; surface of middle of prosternum punctate like head and surface between median and coxal carinae slightly more coarsely and densely so. Mesosternum with apex broadly, feebly rounded and not margined immediately opposite apex of prosternal process; sides (together with lateral part of apex) distinctly margined; surface with punctures finer than those of prosternum and separated by three to six diameters. Metasternum with median longitudinal line complete but very indistinct and only visible in certain lights; surface punctate like mesosternum; side among microscopic punctures near episternum with about 20-25 round, deep punctures which are nearly as coarse as facets of eyes; surface in front of hind femoral cavity without a marginal line or with a very short, indistinct one near coxa. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of

first sternite punctate like metasternal disk but with an occasional coarse puncture adjacent to lateral carina; surface of other sternites punctate like pronotal disk but without coarse punctures.

Specimens examined:—ENGLAND: 1, Cambridgeshire, Madingley Wood, xii.1831 (*Power*); 2, MALAYA: Temerloh, 21.vii., in stored rice; 1, CEYLON: Kalutara, 29.v.1930, *ex* aurack vat (*M. P. D. Pinto*). The holotype has also been examined.

Murmidius stoicus sp. n.

Length, 1.12 mm.; breadth, 0.71 mm. Body obovate and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), recumbent, pale hairs. Cuticle strongly shining and moderately dark rufo-piceous; antennae and legs brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this flexed part extending to fronto-elypeal suture; surface with punctures slightly more than half as coarse as facets of eyes and separated by one to two diameters; surface between punctures smooth. Clypeus with fronto-elypeal suture very finely but distinctly impressed and complete; anterior margin very broadly rounded; surface sculptured like head but near anterior margin with punctures distinctly denser. *Pronotum* with broadest point, which is across base, more than twice as broad as long (0.54 mm. : 0.24 mm.), base broader than apex between antennal cavities (0.54 mm. : 0.35 mm.), and apex between antennal cavities more than five times as broad as an antennal cavity (0.35 mm. : 0.068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side of middle; apex bordering antennal cavities margined like sides, this marginal line extending towards middle along apex to a point slightly beyond mesal margin of eye. Surface without trace of sulci or other impressions; discal punctures similar to those of head but becoming coarser near antennal cavities where they are sometimes two-thirds to three-fourths as coarse as facets of eyes. *Elytra* three times as long as pronotum (0.90 mm. : 0.24 mm.). Near humeri scarcely noticeably gibbous (one specimen has on basal margin on each side near humerus a short, low, very fine, longitudinal fold). Surface confusedly punctate, without trace of serial punctures; punctures on basal part of disk slightly but distinctly coarser than those of pronotal disk and separated by one and a half to two diameters; surface between punctures smooth; middle discal region near suture with a large oval area which is only microscopically and very sparsely punctate; punctures becoming finer and sparser towards sides and very near apex. *Prosternum* with median carinae confined to basal third, rather inconspicuous, and feebly diverging anteriorly; carina in front of anterior coxal cavity more prominent than median carina and extending in an oblique and almost straight line to a point near anterior margin; surface of middle of prosternum punctate like basal discal part of elytra but slightly more sparsely and finely so; surface between median and coxal carinae similarly punctate but also finely, transversely alutaceous. *Mesosternum* with apex broadly, feebly rounded and finely, completely margined; sides not margined; surface with punctures slightly finer than those of head and separated by two to four diameters. *Metasternum* with median longitudinal line not distinctly impressed, more or less complete, and only visible in certain lights; disk more finely and sparsely punctate than mesosternum; sides with punctures slightly denser and coarser (some punctures being nearly as coarse as those of elytra) but without the usual group of round, coarse punctures; marginal line anterior to hind femoral cavity very fine and complete to metasternal episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites rather evenly and nearly as coarsely and densely punctate as base of elytra.

Type: In the British Museum (Natural History). SINGAPORE, 17.iii.1923, under bark (*C. J. Saunders*).

Paratypes : Two with same data as type.

Variations : All three specimens are very similar, but the short and very fine basal fold opposite the humeri is absent in the two paratypes.

Comparative notes : This species may be distinguished from *M. segregatus* Waterhouse as shown in the key given above. In addition it differs in having the punctures of the sides of the metasternum fine and uniform in size, whereas in *M. segregatus* there are here, among the usual fine punctures, about 20-25 round, deep punctures which are nearly as coarse as the facets of the eyes.

***Murmidius hebrus* sp. n.**

Length, 1.23 mm.; breadth, 0.76 mm. Body obovate and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than facets of eyes), recumbent, pale hairs. Cuticle strongly shining and black to very dark rufo-piceous; ventral surface only moderately dark rufo-piceous; antennae and legs brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this line extending to fronto-clypeal suture though very indistinct just before suture; surface with punctures about half as coarse as facets of eyes and usually separated by two diameters; surface between punctures smooth. Clypeus with fronto-clypeal suture very finely impressed but distinct and complete; anterior margin very broadly rounded; surface, particularly anteriorly, slightly more densely punctate than head. *Pronotum* at broadest point, which is across base, twice as broad as long (0.57 mm. : 0.29 mm.), base broader than apex between antennal cavities (0.57 mm. : 0.36 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0.36 mm. : 0.068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate; apex bordering antennal cavities margined like sides, this marginal line extending inwards on each side along apex to a point beyond mesal margin of eye. Surface without trace of sulci or other impressions; discal punctures slightly coarser and very slightly denser than those of head; punctures do not become coarser towards antennal cavities but near middle anterior margin there is an occasional coarser, rather indistinct puncture. *Elytra* three times as long as pronotum (0.95 mm. : 0.29 mm.). Near humeri not distinctly gibbous. Surface confusedly punctate, without trace of serial punctures; punctures on basal part of disk scarcely noticeably coarser than those of pronotal disk and slightly sparser; punctures on most of median part of elytra about a fourth or third coarser and usually separated by two diameters; surface between punctures smooth or nearly so; punctures on an oval area on middle of disk (highest part of elytra) much finer and sparser; punctures near sides and very near apex also finer and sparser. *Prosternum* with median carinae confined to basal fourth, moderately prominent, very feebly diverging anteriorly; carina in front of anterior coxal cavity as prominent as median and extending in an oblique and almost straight line to near anterior margin; surface of middle of prosternum punctate like head but very slightly more coarsely so; surface between median and coxal carinae similarly punctate but anteriorly with a few transverse alutaceous lines. *Mesosternum* with apex broadly, feebly rounded and finely, completely margined; sides not margined; surface with punctures slightly coarser than those of base of head and separated by two to four diameters. *Metasternum* with median longitudinal line complete and very finely, not distinctly impressed; disk distinctly more finely and sparsely punctate than mesosternum; sides with punctures slightly denser and also with 8-12 shallow, round punctures which are about one-third coarser; marginal line in front of hind femoral cavity fine, distinct, and complete. *Abdomen* with lateral carina or stria of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites evenly punctate like pronotal disk but usually more sparsely so; without coarse punctures.

Type: In the British Museum (Natural History). AFRICA: N. Rhodesia, Congo-Zambesi watershed, 1928 (H. S. Evans).

Comparative notes: This species is very closely related to *M. stoicus* sp. n., but it may be distinguished as follows: (1) the dorsal surface is black to occasionally very dark rufo-piceous instead of moderately dark rufo-piceous; (2) the punctures near the antennal cavities are no coarser than those of pronotal disk, whereas in *M. stoicus* sp. n. they are frequently a third coarser; (3) the median carinae of the prosternum are moderately prominent and confined to basal fourth instead of rather inconspicuous and present on basal third; and (4) the side of the metasternum has from 8 to 12 round punctures which are distinctly coarser than others, whereas in *M. stoicus* sp. n. the lateral metasternal punctures are more or less uniform in size and there are no round and distinctly coarser punctures.

Murmidius tydeus sp. n.

Length, 1.1 mm.; breadth, 0.60 mm. Body subparallel and strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than eye facets), recumbent to suberect, pale hairs. Cuticle strongly shining and moderately dark rufo-piceous; antennae and legs paler and brownish-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards; surface with punctures about one-half as coarse as facets of eyes and usually separated by two to four diameters. Clypeus with fronto-clypeal suture not visible; anterior margin evenly and very broadly rounded; surface with punctures near anterior margin slightly but distinctly coarser than those of head and separated by one to one and a half diameters. *Pronotum* at broadest point, which is across base, twice as broad as long (0.52 mm.: 0.23 mm.), base broader than apex between antennal cavities (0.52 mm.: 0.32 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0.32 mm.: 0.068 mm.). Sides nearly straight and finely, distinctly margined; base feebly bisinuate on each side; border of antennal cavities margined like sides, elsewhere with apex not margined. *Pronotum* on each side beginning near mesal margin of antennal cavity with a broad shallow sulcus (two-thirds as broad as antennal cavity), which is narrowed caudally and extends two-thirds of distance to base; near middle and parallel to the latter is a much less distinct sulcus which appears to be formed by the joining together of 3-5 coarse punctures. Surface with discal punctures slightly but distinctly coarser than those of head (about two-thirds as coarse as facets of eyes) and separated by about two diameters; anterior half of pronotum with a number ($14 \pm$) of round to oval punctures which are as coarse, or very nearly as coarse, as facets of eyes. *Elytra* nearly four times as long as pronotum (0.84 mm.: 0.23 mm.). Near humeri with a moderately broad, feebly gibbous area. Surface not striate but with punctures arranged in distinct rows; serial punctures on basal half of disk about as long as facets of eyes, moderately shallow, oval to elongate (one and a half to two times as long as broad), about one-fourth as broad as intervals, and separated longitudinally usually by one and a half to two or even more lengths; towards apex serial punctures become finer and even disappear. Intervals with a median, poorly defined row of sparse, microscopic punctures; between punctures surface is usually smooth. *Prosternum* with median carinae prominent, parallel, and extending to anterior third; carina in front of anterior coxal cavity nearly as prominent as median and extending in an oblique, almost straight line to near anterior margin; surface of middle of prosternum nearly as coarsely and densely punctate as base of pronotal disk; surface between median and coxal carinae more finely and sparsely punctate. *Mesosternum* with anterior margin strongly, broadly rounded and completely margined but with marginal line at middle very fine; sides completely and slightly more thickly

margined; surface with punctures as fine as those of head and separated by three to six diameters. Metasternum with median longitudinal line complete, shallowly impressed, and about as broad as an eye facet; disk punctate like mesosternum and with surface between punctures also smooth; at extreme side with about 14 round to feebly oval, shallow punctures which are nearly as large as eye facets; in front of hind femoral cavity with a fine, transverse marginal line which extends nearly to episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth; surface of sternites punctate like head (more densely and slightly more coarsely than metasternal disk); second and third sternites with a median row of 4-6 coarse, round punctures (similar to those of sides of metasternum) which do not extend mesally to middle third.

Type: In the British Museum (Natural History). SINGAPORE, ii.1922 (C. J. Saunders).

Comparative notes: *M. tydeus* sp. n. is the least oval member of the genus; and it is the only one which can be described as being subparallel. It belongs to the group of species which have the coarse punctures of the elytra arranged in definite rows. From its allies it may be distinguished by its oval to elongate instead of round serial punctures of the elytra and the complete instead of incomplete marginal line of the mesosternum.

Murmidius ovalis (Beck).

1817. *Hister ovalis* Beck, *Beitr. baier. Insektenfauna* : 7, t. 1, f. 1.

1821. *Murmidius ferrugineus* Leach, *Trans. Linn. Soc. Lond.* 13 : 41.

1829. *Ceutorcerus advena* Schueppel, in E. F. Germar, *Ins. Spec. Novae* 1 : 85.

• Length, 1.2-1.4 mm.; breadth, 0.71-0.93 mm. Body broadly oval, strongly convex; dorsal surface moderately sparsely and inconspicuously clothed with fine, short (slightly longer than facets of eyes), recumbent, pale hairs. Cuticle strongly shining and dark to moderately pale rufo-piceous. *Head* with margins above eyes strongly and narrowly flexed upwards, this flexed line extending to fronto-clypeal suture; surface with microscopic punctures (about one-third as coarse as facets of eyes) which are separated by two to four diameters. Clypeus with fronto-clypeal suture fine but distinct and complete; anterior margin broadly and feebly rounded, nearly truncate; surface more densely and slightly more coarsely punctate than head. *Pronotum* at broadest point, which is across base, twice as broad as long (0.65 mm. : 0.27 mm.), base broader than apex between antennal cavities (0.65 mm. : 0.41 mm.), and apex between antennal cavities five times as broad as an antennal cavity (0.41 mm. : 0.082 mm.). Sides feebly arcuate, nearly straight and finely, distinctly margined; base feebly bisinuate on each side; anterior margin finely margined opposite antennal cavities, elsewhere not margined. On each side from mesal anterior margin of antennal cavity is a shallow to moderately deep sulcus which extends one-half to two-thirds of distance to base; nearer middle and parallel to the latter is a less distinct sulcus formed by the joining together of two or three coarse punctures. Surface with discal punctures very slightly coarser and denser than those of head; in apical part of lateral sulcus and near anterior margin with a few round to oval, shallow punctures which are as coarse as or slightly coarser than facets of eyes; surface between punctures smooth. *Elytra* nearly four times as long as pronotum (1.06 mm. : 0.27 mm.). Near humeri with a moderately broad, feebly gibbous area. Surface without striae (very rarely with feebly impressed striae) but with punctures arranged in distinct rows; serial punctures usually round, occasionally slightly oval, as coarse as to one-fourth coarser than facets of eyes, and separated longitudinally usually by one and a half to two or even three diameters. Intervals sparsely, microscopically punctate, usually nearly smooth but sometimes alutaceous.

Prosternum with median carinae prominent, parallel, and present on basal two-thirds; carina in front of anterior coxal cavity extending obliquely outwards in an almost straight line to near anterior margin; surface of middle of prosternum as finely but more sparsely punctate than head; surface between median and coxal carinae with distinctly coarser punctures separated by two to three diameters. *Mesososternum* with apex broadly rounded and marginal line absent opposite apex of prosternal process; sides, as well as sides of apex, distinctly and finely margined; surface punctate like middle of prosternum. *Metasternum* with median longitudinal line finely impressed and complete; disk nearly flat and punctate like middle of prosternum; sides among fine punctures with 12-20 round, deep punctures which are slightly coarser than facets of eyes and are nearly contiguous to separated by two diameters; marginal line in front of hind femoral cavity absent or if present never extending more than one-half of distance to episternum. Abdomen with lateral carina (or stria) of first sternite extending in a broad curve to lateral margin at posterior fifth. Surface of sternites with punctures coarser and denser than those of metasternal disk; also with a few much coarser punctures adjacent to lateral carina of first sternite and forming transverse median rows at sides of sternites two to four.

Specimens examined: EUROPE, AFRICA (Nigeria), JAPAN, CHINA, INDIA (Assam), AUSTRALIA.

I have examined seven specimens from N.W. Australia (4, Port Darwin; 3, Adelaide River) which differ from the European, African, and Oriental examples as follows: (1) their average size is slightly greater; (2) the elytra are distinctly but feebly striate, whereas in the specimens from other localities the elytra usually have no trace of striae and are only rarely with very indistinct striae; (3) the serial punctures on basal half of elytra in rows 3-7 are seldom separated by as much as one diameter; (4) the intervals of the elytra are frequently feebly and reticulately alutaceous instead of smooth; (5) the microscopic punctures of the elytral intervals are distinct and usually separated by two to five diameters instead of indistinct and much sparser; and (6) the transverse rows of coarse punctures on abdominal sternites two to four are complete, whereas in the specimens from other localities they are generally confined to lateral third.

NOTES ON SIMULIIDAE (DIPTERA)

By John SMART, Ph.D., F.R.E.S.

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THE notes which follow are in the nature of a postscript to my paper on SIMULIIDAE from British Guiana and the Lesser Antilles (Smart, 1940).

Simulium amazonicum Goeldi.1905, *Os mosquitos no Para* : 138.

Goeldi stated in his original description that he had deposited a series of co-types in the British Museum. I did not have these before me when preparing the paper mentioned above. During the evacuation of the Diptera collections in 1941, on account of air raids, the tube containing Goeldi's co-types was found. The material is in spirit and, except for expected fading, in good condition. Since the material is in spirit a full redescription of the species cannot be prepared, but I give below some notes on certain characters that can be seen in the spirit material and which have some bearing on the sub-generic position of the species and its identification. All the specimens are females.

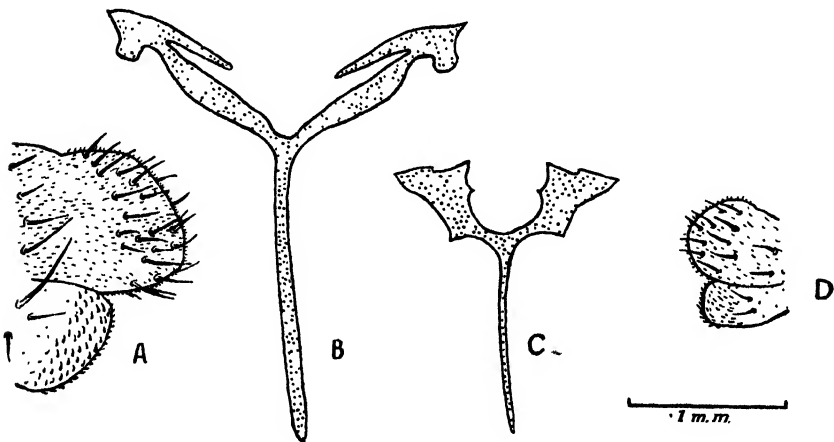


FIG. 1.—Female genitalia of *Simulium amazonicum* Goeldi and *Simulium guianense* Wise. A. *S. guianense*, tip of anal lobe and cercus; B. *S. guianense*, genital fork; C. *S. amazonicum*, genital fork; D. *S. amazonicum*, tip of anal lobe and cercus.

The thoracic pattern, as far as it can be seen in spirit material, corresponds almost exactly with the pattern figured by Porto (1939). The coloration of the hind leg is as figured by Lutz (1917). The pedisulcus and the calcipala are both present and the claws are simple (without a basal tooth). The wing is without a basal cell, the radius is not

forked and its basal sector is bare of hairs. The antennae have eleven segments. The tergites of the apical segments of the abdomen are shiny. The pleural tuft is present but there are no hairs on the membranous area of the pleuron. The female genitalia are now illustrated (fig. 1).

The re-examination of Goeldi's co-types, as far as it has been possible to carry it out, raises no doubts as to the correct recognition of this species by various workers. A slight emendation of my key (Smart, 1940) to the effect that the median dark stripe may reach the anterior margin of the dorsum of the thorax is called for, but this does not affect the use of the key for practical determinations.

The above descriptive notes are based on a series of 38 females in spirit accompanied by the following label in the handwriting of the late E. E. Austen: "*Simulium amazonicum*, Goeldi.—Co-Types, (The 'Pium'), Born Lugar, Rio Purús, Amazons Region, Brazil. May, 1904.—Dr. J. Huber. Pres. by Dr. E. A. Goeldi. (Recd. 6-vi-1905)", and a small label in an unknown hand, reading "Pium, Born Lugar, (Purus), v.1904." The material was unregistered and now has the registration no. B.M. 1941 : 19. Two of the specimens have been pinned and dried and two have been dissected and mounted in balsam on microscope slides. Since it is not clear whether Goeldi (*loc. cit.*) was using the term "co-type" *strictu sensu* or loosely, in the sense common with continental workers, as an equivalent of para-type, I refrain from selecting a lecto-holo-type. I have, however, marked the slide from which the present figure of the female genitalia was made. This plesio-co-type may be designated as the lecto-holo-type should it be considered that Goeldi was using the term "co-type" in its correct sense.

Simulium clavipes Malloch.

1914, U.S. Dept. Agric., Bur. Ent. (Tech.) 26 : 40.

I carelessly overlooked this species from Guadeloupe when preparing the paper (Smart, 1940) referred to above. Pinto (1932), in his catalogue of the SIMULIIDAE of Central and South America, also omitted it. The type series, which were all females, came from "Guadeloupe, West Indies, 4,000-foot level, July (*August* Busck)" and are presumably in the U.S. National Museum at Washington. It is not clear from Malloch's text whether the type series consists of one or more specimens.

I consider it to be a synonym of *Simulium tarsale* Williston which I deal with below.

Simulium guianense Wise.

1911, *Timehri* (3) 1 : 252.

The rarity of the work in which this species was originally described has led to its being ignored by many workers. I should have mentioned in my paper on the SIMULIIDAE from British Guiana and the Lesser Antilles (Smart, 1940) that the original description was republished in 1912, *J. trop. Med. Hyg.* 15 : 43, where it may be more accessible to some authors. In view of the fact that Fairchild (1940) has published figures of the female genitalia of several species of SIMULIIDAE from Panama I give, herewith, a figure of the female genitalia (fig. 1) of *S. guianense* made from a specimen (plesio-homo-topo-type),

taken by myself in British Guiana, Sept. 1937, which had been compared with the type series before dissection and determined as conspecific. I suspect that *S. lugubre* Lutz (see below) may prove to be a synonym of *guianense* but cannot come to a conclusion on this point without having authenticated specimens of Lutz's species before me.

Simulium lugubre Lutz.

1928, *Estudios Zoologia Parasitologia venezolanas* : 46 (Rio de Janeiro).

Fairchild (1940) considers this species a synonym of *Simulium mexicanum* Bellardi. Although Lutz's textual description gives characters that enable *lugubre* to be separated from *guianense* Wise (Smart, 1940), the coloured figure of the former published by Lutz bears a remarkable resemblance to the latter species. There is also a general resemblance in the pupal filaments (*vide* Lutz's figure, *loc. cit.*) of the former species and my figure (Smart, 1940) of the filaments of the latter species, though the former are figured as longer than the latter.

Simulium ochraceum Walker.

1860, *Trans. ent. Soc. Lond.* (n.s.) 5 : 332.

Although this paper is mainly concerned with material supposed to be lodged in the British Museum, reported as missing and recently recovered, I regret that the type series of this species remains unknown to me.

Simulium quadrivittatum Loew.

1862, *Dipt. Amer. Sept. II. Berlin. ent. Z.* 6 : 186.

I have a letter (dated 30.vii.1940) from Mr. C. T. Parsons which reads as follows: "I notice in your recent paper that you state that the type of *Simulium quadrivittatum* Loew is possibly in Berlin. Like all of Loew's New World types, the type of *quadrivittatum* is in the Mus. Comp. Zoology. There are two cotypes on one pin, labelled 'Cuba, Gundlach'." I have to record my thanks to Mr. Parsons for this information.

Simulium tarsale Williston.

S. tarsale Williston, 1896, *Trans. ent. Soc. Lond.* 29 : 268.

S. tarsale Williston of Malloch, 1914, *U.S. Dept. Agric., Bur. Ent. (Tech.)* 26 : 46.

S. clavipes Malloch, 1914, *U.S. Dept. Agric., Bur. Ent. (Tech.)* 26 : 40.

S. tarsale Williston of Smart, 1940, *Trans. R. ent. Soc. Lond.* 90 : 9.

In my paper, cited above, I stated that the type series of this species, which should have been in the British Museum, was not to be found there. During the evacuation of the Diptera collections on account of air raids in 1941 the three specimens which constitute the type series were discovered. These three specimens ranked as co-types and the labels on them leave no doubt as to their authenticity. It would appear that these specimens, as well as a few other Nematocera from the same collection, were not put into the cabinets at the time when the bulk of the collection from St. Vincent was incorporated into the general collection of Diptera.

Williston in his description stated that there were three specimens. He described only the female. The legend for the plate on which appear the figures of the wing and fore leg of *S. tarsale* reads "fig. 25. *Simulium tarsale*, wing, 25a ♂ front tarsus." The three specimens before me now are undoubtedly all females and it would appear that the above legend, which is repeated in the figure citation in the text, is erroneous. The figure of the tarsus depicts all the characters exhibited by the tarsi of the females of the type series.

Although referred to by both Malloch (*loc. cit.*) and myself (*loc. cit.*) specimens of *tarsale* have not been recognised since it was originally described.

I have compared the type specimens of *tarsale* character for character with Malloch's description of *clavipes* (*loc. cit.*) and have no hesitation in sinking the latter name as a synonym of the former. Such differences as can be found between the descriptions of the two species as they were published are of such a kind as may be said to be entirely due to differences in the subjective conceptions of the two authors. The type series of *tarsale* all have the vestiture of upright brown hairs that Malloch described for *clavipes* and which he assumed *tarsale* lacked since Williston did not mention it; the abdomens of the type series of *tarsale* are all very shrunken, which accounts for the small size. "2 mm.", stated by Williston.

The following characters are possessed by the type specimens though not mentioned by Williston. Antennae with 11 segments and a marked constriction between segments 2 and 3. Face and frons both matt. The brassy reflecting hairs that lie adpressed to the dorsum of the thorax are quite definitely hair like and are not completely reduced to the scale-like metallic structures found on some species. The wings have no basal cell, the radius is unforked and has the basal sector bare, and the cubitus is strongly bent. The coloration of the legs varies slightly from specimen to specimen. It would appear that in species of *Simulium* where the leg coloration does not consist of definite bands it is dangerous to rely overmuch on this character. In one co-type of *tarsale* the second tarsal segment of the hind leg would be described as "dark brown with the basal half pale," in another it is entirely dark brown. There is also a variation in the depth of the general pigmentation. Thus in one specimen the dorsal surface of the humeral region is paler than is the same region in the other two co-types. This lightening of the pigmentation is general and affects all the other pigmented parts. The pedisulcus and calci-pala are present. The genitalia are not visible and I have preferred not to dissect them out at the present time. The species runs to the subgenus *Simulium* in Edwards's (1931) key; the examination of the co-types calls for no modification of my key (Smart, 1940); Malloch (*loc. cit.*) did not place *tarsale* in his key and the species will therefore run out to its synonym *clavipes*.

One of the co-types lacks a wing and is therefore presumably the one that was figured. I designate this specimen as the lecto-holo-type. The remaining two specimens therefore now rank as paratypes. All three are labelled as follows:—"Windward side St. Vincent, W.I., H. H. Smith, West Indies, 1907-66" (1907-66 is the British Museum registration no.); the lecto-holo-type and one paratype are labelled "1,000 feet" and the lecto-holo-type carries a ms. label "Forest, by stream, March" and Williston's determination label. I presume, however, that the data on the lecto-holo-type apply to all three specimens.

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Since the publication of my paper on SIMULIIDAE from British Guiana and the Lesser Antilles four recent papers dealing with Neotropical SIMULIIDAE have come to my notice ; they are marked * in the list of references given below.

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- *——, 1940, Simulídeos da região neotropical. *Rev. Mus. Paulista* 24 : 383-385.
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15. *Dysphaea dimidiata limbata* Selys.

1 male, Kenas Dam near Kuala Kangsar, c. 300 ft., 9.i.38 (*Jackman*). A very local and somewhat rare species extending from Malaya to Borneo. These insects have a habit of perching on rocks or half-submerged trunks of trees far out in midstream, so that they are often most difficult to secure. Females are extremely rare.

16. *Vestalis amoena* Selys.

5 males, 2 females from same locality as the last. Occurs in large colonies and is confined to Malaya and Indo-China.

17. *Neurobasis chinensis* (L.).

2 males, Kenas Dam, Kuala Kangsar, 9.i.38, and at 14th mile, Waterfall Road, Cameron Highlands, coll. Hayward, 30.i.38. A common and widely distributed species throughout the Orient.

18. *Climacobasis modesta* (Laidlaw) = *Echo modesta* Laidlaw.

2 females, Bukit Kutu, c. 2000 ft., 26.vi.37. A very local and, I believe, rare insect, the two sexes of which are so strongly differentiated that they were formerly treated as separate species. The female closely resembles a *Mnais* by its colouring and shape of pterostigma, which is followed by 2 rows of cells, or more rarely by 3 rows. I possess a single female from Langkawi Island collected by Dr. Kerr, which, like the present two specimens, has the wings deeply infuscated.

Suborder Anisoptera.

19. *Anax guttatus* (Burmeister).

1 male, Penang Hill, c. 300 ft., 29.viii.37; 1 male, at light, 10.30 p.m., Butterworth, 20.ii.35. Distributed from S. India to the Philippines. This is the first record I have of this species coming to light.

20. *Indictinogomphus melaenops* (Selys) = *Ictinus melaenops* Selys.

1 male, Reservoir, Bukit Panchore, Prov. Wellesley, 24.viii.35, 1 female, same locality, 23.ii.35. Confined to Malaya, where it replaces the more common *Indictinogomphus rapax*. The present specimens are true to type.

Gomphidictinus gen. n. (fig. 2).

A genus of large-sized dragonflies characterised by a combination of the characters of the oriental genus *Gomphidia* and the neotropical genus *Gomphoides*, and belonging to the family GOMPHIDAE, subfamily ICTINOGOMPHINAE (= ICTININAE).

Wings densely reticulated; sectors of arculus closely apposed or actually fused at origins; arculus between the first two basal antenodals or opposite the second; all triangles reticulated, discoidal triangles 4-celled in all wings, that of fore-wing a subequilateral triangle, that of hind-wing elongated, with costal and distal sides subequal and half as long again as the basal: a supplementary sector to the discoidal triangle running as far as border of wing; *subtrigones in both fore- and hind-wings of large size and made up of 3 cells*; discoidal field beginning with a row of 3 cells and then continued as 2 rows to as far as half-way to nodus; CuP in fore-wing pectinated; nodus situated at centre of costa in fore-wing; anal triangle made up of 5 cells; anal loop absent; cubital nervures numerous, especially in

fore-wing; tornus obtusely produced in hind-wing; 2 rows of cells in anal field of fore-wing, 5 in the hind-wing; Riv + v and MA curving in all wings abruptly downwards to meet termen; pterostigma very narrow, of great length, unbraced. Legs short, very robust, hind femora with about 15 short robust spines. Anal appendages resembling those of *Ictinogomphus*; genitalia resembling that of *Gomphidia*, but the penis with a ventral spine as in the South American genera *Progomphus* and *Gomphoides*: anterior to the genitalia and projecting from the 1st abdominal segment is a unique quadrate lobe which overlaps the lamina and hamules. Genotype—*Gomphidictinus wheeleri* sp. n.

This new genus is of great interest as forming a distinct link between the oriental and neotropical genera of the subfamily ICTINOGOMPHINAE.

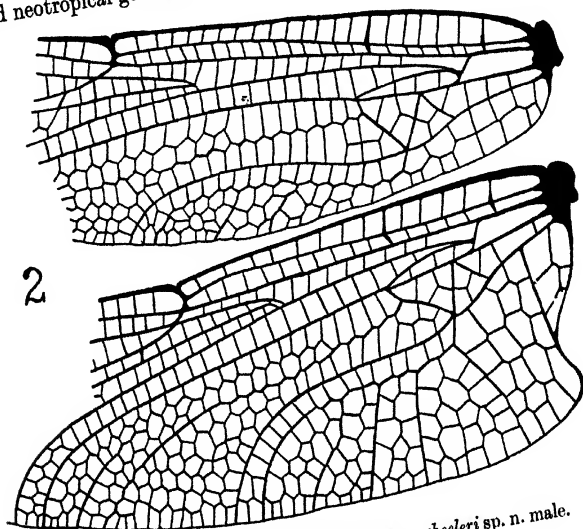


FIG. 2.—Bases of wings of *Gomphidictinus wheeleri* sp. n. male.

21. *Gomphidictinus wheeleri* sp. n. (fig. 3, a to e).

Male. Abdomen 51 mm. Hind-wing 48 mm.

Coloured velvety black marked with bright citron yellow as follows:—the lateral lobes of labrum, a stripe on the anteclypeus confluent with two large triangular spots on the postclypeus, two broad triangular spots on upper surface of frons, a broadly interrupted mesothoracic collar, short and narrow antehumeral stripes on the upper two-thirds of dorsum of thorax, diverging widely from one another below; two broad oblique stripes on sides of thorax rather widely separated by a black stripe. Abdomen black with the apices of hamules, the auricles and a small triangular spot apical to them on segment 2, the basal half of the sides of segment 3 and a broad basal annule covering the basal half of segment 7 all yellow. Occiput slightly angulated posteriorly and with a low rounded elevation on its dorsum; alar sinus with its outer ends prolonged as upwardly curved spines. Anal appendages: superiors broad at base, subcylindrical, hollowed out within and tapering to an acute point: some small spines on the under surface of apex: inferior only one-fourth the length of superiors, subquadrate, shallowly emarginate at apex. Auricles large and with a single curved spine at apex. Genitalia: a quadrate scale-like lobe projecting obliquely backwards from the border of segment 1, with crenate border and spine-like

extensions laterally; lamina short and broad, shallowly and broadly emarginate; hamules long, robust, obtuse at apex; vesicle large, projecting, with basin-like lip. Penis (see fig. 3, a).

Habitat : a single male, the type, Cameron Highlands Road, near waterfall, 14th mile, c. 1100 ft., 11.ix.37 (Dr. Wheeler). The genus to which this new species belongs stands nearest *Gomphidia* in which the penis is similar to that found in the S. American genus *Progomphus* except that it is devoid of the prominent ventral spine. In this new species, however, the ventral spine is present and so it bridges the gap between the two genera. In general facies it resembles *Gomphidia kodaguensis* Fraser, markings and shape of abdomen being closely similar in the two species, but the venation will easily separate them.

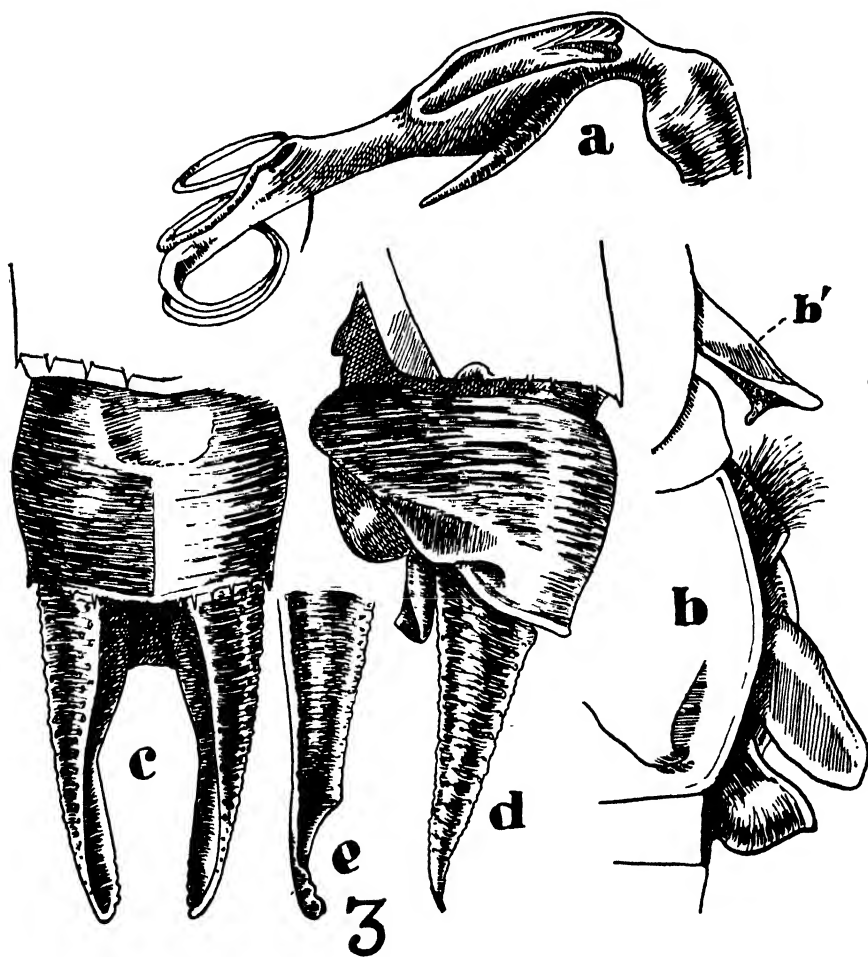


FIG. 3.—*Gomphidictinus wheeleri* sp. n. male. a. Penis. b. Genitalia seen in right profile. b'. Pregenital lobe. c. Dorsal view of anal appendages. d. Left lateral view of same. e. An appendage seen from the inner side.

22. *Macromia westwoodi* Selys.

1 male, Penang Hill, path above waterfall, 21.iii.37. This fine species is distributed throughout Malaya, Java and Sumatra and is both local and uncommon.

23. *Brachygonia oculata* (Brauer) (fig. 4).

1 male, Kuala Ketil, Kedah jungle, 22.xii.35. Very teneral. A species rare in collections which I have not had the opportunity of studying before and in which the venation of the wings is an interesting mixture of archaic and recent elements. The presence of the latter undoubtedly stamps it as a recent species and Dr. Ris was surely correct in his placing of it. The extreme narrowing of the base of the hind-wing has resulted in the loss of the proximal row of cells in the anal loop, which is quite unique in the family LIBELLULIDAE: the position of the arculus and the double row of cells in the discoidal field of fore-wing persisting in spite of the great reduction of the wing, as well as the well-developed supplements, all point to the recent origin of the species. It is in fact the finest example of evolution by reduction to be found in the suborder Anisoptera.

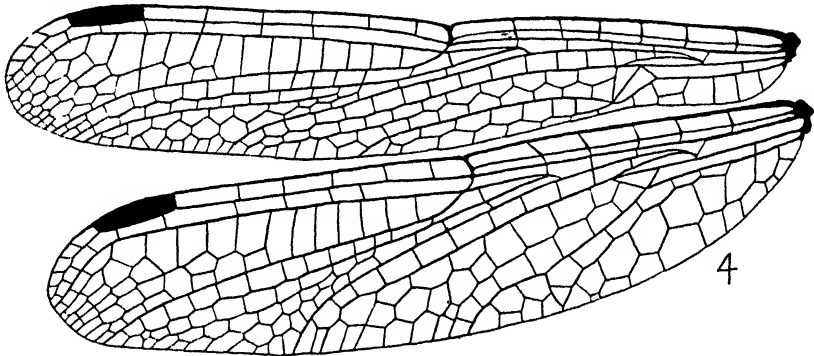


FIG. 4.—Wings of *Brachygonia oculata* (Brauer), male.

24. *Potamarcha obscura* (Rambur).

1 male, near Rest House, Arau, Perlis, 11.ii.37. A common and widely distributed oriental species.

25. *Orthetrum glaucum* (Brauer).

3 males. Cameron Highlands Road, c. 2000 ft. 12.ix.35; Reservoir, Bukit Mertajam, 12.i.35, and Taipeng Pass, 26.xi.35. A common and widely distributed oriental species.

26. *Orthetrum triangulare* Selys.

1 male, Jor Camp, Cameron Highlands Road, c. 1600 ft., 28.iii.37; 1 male, same road, 2600 ft., 11.ix.37. Same remarks as for *O. glaucum* but rarely found below an altitude of 4000 ft., this species beginning where *glaucum* leaves off.

27. *Orthetrum testaceum testaceum* (Burmeister).

2 males, 1 female. Botanic Gardens, Penang, 6.xi.37; Penang Hill, c. 1200 ft., 7.iii.37, and foot of Maxwell's Hill, Taipeng Pass, 6.ii.36. Less com-

mon and less widely distributed than the two last species : Malaya and Java. A plain species rarely found above 1200 ft.

28. *Orthetrum sabina* (Drury).

2 males. Near Siong, Baling, Kedah, 30.vi.35 and Taipeng Pass, 31.iii.35. An extremely common oriental species.

29. *Crocothemis servilia* (Drury).

2 males and 2 females all from lowlands of Perlis. Widely distributed at all times of the year throughout the Orient.

30. *Rhodothemis rufa* (Rambur).

A single female from Sunger Tembur, Prov. Wellesley, 15.i.38. A species of wide oriental distribution but only found singly and that rarely. I have taken it in Bombay and at places in the Nilgiris.

31. *Brachydiplax farinosa* Kruger.

1 male, Forest Reserve, Trolak, Perak, 25.vi.37. Occurring in moderately large colonies and very local; breeds in marshes and shallow weedy ponds. The present specimen is a fully adult pruinosed example.

32. *Brachythemis contaminata* (Fabricius).

A single very teneral female of this common oriental species. Reservoir, Bukit Panchore, 19.x.35.

33. *Diplacodes trivialis* (Rambur).

2 females. Reservoir Penang, 6.vi.37, and Reservoir Mertajam, 28.ix.35. Widely distributed throughout the oriental region.

34. *Trithemis aurora* (Burmeister).

3 males. Bentong K.L. Road, Pahang, 30.vi.37; Reservoir, Bukit Mertajam, 3.xi.35, and Cameron Highlands Road, 14th mile, 30.i.38. Widely distributed throughout the oriental region.

35. *Trithemis festiva* (Rambur).

1 male, Kenas Dam, K. Kangsar, 9.i.38. Widely distributed throughout the oriental region.

36. *Zygonyx malayana* (Laidlaw).

1 male, Bukit Mertajam, Reservoir, Prov. Wellesley, 24.v.36. As Laidlaw states, this species lies near *Z. mildredae* Fraser from Burma, but the two are separated by the broader base of hind-wing in the latter, where 4 rows of cells, instead of 3, intervene between the anal loop and border of wing. The recognition mark on segment 7 is absent in both species.

37. *Neurothemis tullia tullia* (Drury).

5 males and 1 female, all from the lowlands, and mainly in rice fields. A common species occurring in large colonies in paddy or marshes, and at all times of the year save during the height of the monsoon. Distributed throughout the orient but largely replaced in Indo-China by the subspecies *N. tullia feralis*.

38. *Neurothemis fulvia* (Drury).

2 females, andromorphs, Malakoff Estate, Kuala Ketil, Kedah, 9.ii.36, and Wang Tangga, Perlis, 11.ii.37. A gregarious species usually confined to bamboo jungle, where it may be seen settled in vast numbers. Strictly oriental in distribution.

39. *Neurothemis fluctuans* (Fabricius).

7 males and 1 female. Forest Reserve, Trolak, Perak, 25.vi.37; Reservoir, Bukit Panchore, Prov. Wellesley, 13.vii.35, and Taipeng jungle path, 1000 ft., 9.vi.37. Same remarks as for last but a more eastern distribution and not found west of Malaya. Local in Java.

40. *Rhyothemis phyllis phyllis* (Sulzer).

3 females. Reservoir, Bukit Mertajam, 14.xii.35; Kedah Peak, c. 2000 ft., 27.x.35, and Waterfall Quarry, Kedah Peak, c. 100 ft., 28.xi.37. Distribution, Malaya and Java. A gregarious species flying in localised swarms, generally in the neighbourhood of marshes or rank weedy ponds.

41. *Rhyothemis plutonia* Selys.

A single female, 73rd mile, Grik Road, Upper Perak, 5.xii.37. Extends from Bengal, through Burma to Malaya, being nowhere at all common. This species mimics the bee *Xylocopa* when on the wing.

42. *Rhyothemis obsolescens* Kirby.

A single female from Trolak Forest Reserve, Perak, 25.vi.37. Apparently uncommon: specimens have always come to me in singles, so that it does not appear to be gregarious like most of the other species belonging to the genus. Distributed from Lower Burma to Borneo: I have specimens from King Island, Mergwe.

43. *Pantala flavescens* (Fabricius).

A single specimen from Bukit Mertajam, Reservoir, c. 300 ft., 29.v.37. A very common species with a circumtropical distribution.

44. *Urothemis signata insignata* (Selys).

1 male, Bukit Panchore, Reservoir, Prov. Wellesley, 19.x.35. A local but moderately common species found flying over weedy ponds and lakes. Not common in collections, probably due to the difficulty in taking it. I have taken the subspecies *signata signata* in numbers in Western India.

DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPT.)¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

Aploderus indicus sp. n.

Shining, black, the elytra yellow infuscate at the base, scutellary region and postero-externally. Antennae and 3rd segment of the maxillary palpi black. Legs reddish-yellow. Length 4.5 mm.

In build, size and colour very like *caelatus* Gravenhorst, but with longer antennae, the penultimate segments as long as broad; head and thorax less punctured and with much less distinct ground-sculpture, the puncturation of the elytra finer and less close. Head almost as broad as the thorax, the eye a little shorter than the rounded post-ocular region, with a few small obsolete punctures and feeble ground-sculpture. Thorax transverse (6:4.5), the sides in front less rounded than in *caelatus*, along the middle with a more or less distinct keel and on each side of it with a curved superficial impression, the punctures rather large but superficial and scanty, the ground-sculpture feeble. Elytra longer (7.5:4.5) and broader than the thorax, a little broader than long, more finely and less closely punctured than in *caelatus*. Abdomen parallel, almost impunctate, finely coriaceous.

Darjeeling district: Ghum. Type in my collection.

Oxytelus (Tanyeraerus) proximus sp. n.

Very shining, black, the elytra yellow. Antennae black, the first four segments and legs reddish-yellow. Length 5.2 mm.

Very near *discalis* Cameron, of the same lustre and colour but larger, the head more square, less transverse, the frontal margin rounded and more strongly elevated, the punctures between the antennal tubercles finer and not so close, the eye a little shorter than the rounded post-ocular region; thorax with the median sulcus much shorter, limited to the anterior half, the lateral sulci also much shorter, the punctures on the disc much larger, the sides very slightly sinuate behind, the posterior angles obtuse. From *punctipennis* Fauvel, it differs in the larger size, the strongly thickened elevated and rounded frontal margin, more sparing, smaller and not elongate punctures of the head; thorax broader, the median sulcus limited to the anterior half, the lateral shorter and less deep, the puncturation less close; the puncturation of the elytra a little coarser; the 7th sternite in the ♂ less produced in the middle and broader. ♂: head scarcely narrower than the thorax, very slightly transverse, the eye a little shorter than the rounded post-ocular region, the antennal tubercles and frontal margin strongly elevated, thickened and rounded in front, the strongly depressed clypeal region impunctate and feebly coriaceous, between the antennal tubercles with numerous small punctures, the base of the head more coarsely punctured but not rugose and without ground-sculpture. Antennae as in *discalis*. Thorax transverse (3.5:2.5), trapezoidal, the sides a little emarginate before the obtuse posterior angles, the median sulcus rather broad and limited to the anterior half, the lateral short, much narrower, slightly curved; sides obliquely impressed, moderately coarsely and moderately closely punctured, ground-sculpture absent. Elytra a little

¹ Continued from 1941, *Proc. R. ent. Soc. Lond.* (B) 10: 147.

longer than the thorax, striate-punctate at the sides, the punctures rather close and smaller than those of the thorax. Abdomen almost impunctate, the ground-sculpture very weak.

♂: 6th sternite with a pair of minute tubercles on the posterior margin which is truncate between them: 7th a little produced in the middle and truncate.

♀: unknown.

Darjeeling district: Ghum, Tiger Hill, altitude 8000–10,000 feet. Type in my collection.

Oxytelus (Emopotylus) falsus sp. n.

Shining; head black, thorax dark reddish-brown, elytra and abdomen pitchy black or pitchy brown. Antennae blackish, the first five segments and apical half of the 11th reddish-yellow. Legs reddish-yellow. Length 3 mm.

In build and lustre very like *nitidifrons* Wollaston, but of darker colour, the eyes a little larger, but shorter than the rounded post-ocular region, finely faceted, base of head with short median sulcus, the smooth clypeal region with a few fine punctures, the posterior half with coarse punctures, coarser than in *nitidifrons*, not elongate, the supra-orbital ridge produced to the base as in that species, thorax as in *nitidifrons* but with median sulcus narrower, the lateral more distinct, the punctures coarser, elytra also with coarser and deeper punctures; abdomen as in *nitidifrons*.

♂: 7th sternite a little produced in the middle, forming a short lobe with rounded apex.

Darjeeling district: Ghum. Type in my collection.

Oxytelus (Emopotylus) cadaverinus sp. n.

Rather shining; head pitchy black, the frontal region brownish-yellow; thorax dark brown, the sides broadly lighter; elytra brownish-yellow extensively infusate posteriorly; abdomen pitchy, the posterior margins of the tergites narrowly lighter. Antennae and legs reddish-yellow, the 5th to 7th segments of the former infusate. Length 2.5–3 mm.

Near *raffrayi* Fauvel, but larger and much darker in colour, the head shorter and differently sculptured, the thorax and elytra with coarser sculpture. Antennae as in that species. Head transverse, in the ♂ very slightly broader than the thorax, in the ♀ almost as broad, the post-ocular region broadly rounded and much longer than the small finely faceted eye; the depressed frontal region shining and impunctate, the anterior border truncate; the supra-orbital ridge extending backwards to the base and then curved inwards for a short distance; vertex with a deep sulcus in the middle, the area internal to the supra-orbital ridge closely, obliquely striate, the striae finer in the ♂ than in the ♀, the region adjacent to the sulcus with close moderate, more or less confluent punctures: thorax a little longer and so less transverse than in *raffrayi*, and with deeper sulci and yet more coarsely striate-rugose, impunctate: elytra more coarsely punctate-striate than in that species: abdomen almost impunctate, feebly coriaceous.

♂: 7th sternite with very small triangular process at the middle of the posterior margin.

Darjeeling district: Ghum, Lepchajagat. Type in my collection.

Oxytelus (Anotylus) morbosus sp. n.

Closely allied to *complanatus* Erichson, of the same colour and lustre, but with the first three segments of the antennae yellowish-brown: the sculpture of the head scarcely

differs in the two species, but the sulci of the thorax are more superficial and practically impunctate, the ridges much less distinct, at the sides the striae and rugae are much less evident, the punctures fewer, smaller and less distinct, the coriaceous ground-sculpture well marked: elytra much more finely and closely striate, the punctures much smaller and superficial: abdomen finely and closely punctured, much more so than in *complanatus*. Head in the ♂ subquadrate, slightly transverse, nearly as broad as the thorax, in the ♀ smaller, more transverse, distinctly narrower than the thorax. Length 3 mm.

♂: 6th sternite with a pair of minute tubercles before the posterior margin: 7th broadly and very feebly emarginate.

Darjeeling district: Ghum, Lepchajagat. Type in my collection.

***Oxytelus (Anotylus) monticola* sp. n.**

Colour and lustre of *nitidulus* Gravenhorst, but differing in the following respects; a little narrower, the antennae shorter and stouter, the penultimate segments more transverse, head in both sexes less transverse, the eyes smaller, the temples longer; clypeus finely striate, between the antennal tubercles also closely striate but less finely than the clypeus, impunctate; the base closely punctured in the ♂, the punctures more or less elongate, in the ♀ much more finely and obsoletely; thorax longer, less transverse (3.75:3) than in *nitidulus*, the lateral sulci deeper, at the sides more deeply impressed, the ridges with a few small punctures, the sulci coriaceous, the sides finely striate; elytra longer (4:3), much more finely striate and more obsoletely punctured than in *nitidulus*; abdomen scarcely differing from that species. Length 2.75 mm.

♂: 7th sternite produced in the middle as a small yellowish plate with feebly rounded apical margin.

♀: 7th sternite produced triangularly in the middle with the apex rounded.

Darjeeling district: Ghum, Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

***Oxytelus (Anotylus) kashmiricus* sp. n.**

Very shining, black. Antennae black. Legs yellowish-brown, the femora and tibiae often infuscate. Length 3 mm.

Near *nitidulus* Gravenhorst, but entirely black, the head in both sexes dilated behind the eyes, these much smaller; clytra more coarsely punctured and less striate. Head in ♂ as broad as the thorax, in the ♀ a little narrower, distinctly widened and rounded behind the small eyes, before the base with a short median sulcus, on each side of it with a rounded and more superficial impression; the anterior half practically impunctate, posteriorly with puncturation much like that of *nitidulus*, the antennae as in that species. Thorax formed as in *nitidulus*, the sulci similar, the puncturation very similar but with less developed rugae at the sides: elytra much more coarsely punctured than in *nitidulus* and not so distinctly striate. Abdomen practically impunctate, the ground-sculpture feeble. Fore-parts without ground-sculpture.

♂: 6th sternite feebly broadly emarginate with broad superficial more closely punctured impression adjacent. 7th scarcely produced in the middle and feebly rounded.

Kashmir: Gulmarg. Type in my collection.

***Oxytelus (Anotylus) contiguus* sp. n.**

In lustre and antennal structure scarcely differing from *latiusculus* Kraatz, but entirely black and also differing in the following respects: the head is of the same shape but the

frontal margin is much less developed, scarcely elevated and is not continued back beyond the posterior margin of the eye, it is not longitudinally bisulcate but before the base presents two rather large but superficial foveae and a median groove is absent: the clypeus is separated from the rest of the surface by a very obsolete transverse shining line; the sculpture is a little coarser than in *latiusculus* and is the same on the clypeus; the thorax is a little shorter than in *latiusculus* and so more transverse, the sulci much less deep, the ground-sculpture is similar but punctures are entirely absent and the ridges quite dull; the elytra are finely longitudinally striate, but with the punctures very obsolete, scarcely visible. Abdomen as in *latiusculus*. Length 1.5 mm.

♂: head larger, more subquadrate. 7th sternite produced in the middle as an acute triangular process.

♀: head smaller and rounder.

Kashmir: Gulmarg. Type in my collection.

***Platystethus longicornis* sp. n.**

Very shining, black, the elytra yellowish-brown. Antennae black. Legs reddish-yellow. Length 3.75 mm.

A narrow shining species with longer antennae than is usual in the genus. Head a little narrower than the thorax, the eyes small, much shorter than the temples, the vertex with a small median impression, the front impunctate, elsewhere with a few rather large scattered punctures. Antennae rather long, the 2nd and 3rd segments of equal length, 4th and 5th of equal length, slightly longer than broad, the 5th stouter than the 4th, 6th to 10th as long as broad and differing but little, 11th oval, longer than the 10th. Thorax transverse (4.5:3), the sides obtusely angulate before the middle, straightly retracted in front and behind and coarctate with the base, along the middle with a fine impressed line, on each side of it with a row of three moderate punctures, towards the sides with a group of four or five others. Elytra longer (4:3) and broader than the thorax with a few small scattered punctures. Abdomen nearly impunctate, the ground-sculpture very feeble, the fore-parts without trace of ground-sculpture.

Darjeeling district: Ghum. Unique. My collection.

***Bledius (Hesperophilus) hindustanus* sp. n.**

Similar in colour and lustre to *lucidus* Sharp but with longer thorax, the sides parallel to behind the middle, from thence gently rounded and coarctate with the base, the anterior angles more prominent; elytra a little longer, not quite so closely punctured, in other respects similar to *lucidus*. Length 4 mm.

Ferrapore. Unique. British Museum (Natural History).

Erratum.

The species *nanus* described in 1940, *Proc. R. ent. Soc. Lond.* (B) 9:210 as a *Holosus* belongs to *Holotrochus*, a genus of the Osoriini.

***Osorlus assamensis* sp. n.**

Very like *puncticollis* Kraatz, but the frontal margin is narrower, feebly emarginate and distinctly more coarsely crenulate, the declivous front more shining, less coriaceous, the granulations at the sides much finer and less close, the striae and rugae between the eyes finer and less interrupted, the thorax longer and less transverse, the sides more feebly

sinuate behind, the puncturation less deep and not quite so close, the elytra less closely punctured. Length 10 mm.

Assam : Shillong, altitude 6000 feet (*Beeson*). Unique. My collection.

• ***Osorius stevensi* sp. n.**

Size and build of *puncticollis* Kraatz, but the front of the head much smoother, very finely coriaceous, with very few, very fine asperate punctures on each side, the interocular sculpture much less marked, the puncturation of the thorax is finer and much less close, that of the elytra much more sparing and much more superficial, the abdomen more sparingly punctured. Length 8 mm.

Nepal-Sikkim Frontier; Tonglu, altitude 10,074 feet (*Stevens*). Unique. British Museum.

***Osorius peraffinis* sp. n.**

Very near *pectinifrons* Fauvel and only differing in the larger size (8.2 mm.) and more robust build and in the puncturation of the thorax being a little coarser and closer, that of the elytra less superficial. Perhaps a local race only.

Darjeeling : Gopaldhara, altitude 4720-6100 feet (*Stevens*). British Museum (Natural History).

***Osorius masuriensis* sp. n.**

Near *lopchuensis* Cameron. Very similar in build, but with the sides of the thorax very slightly sinuate behind; the frontal margin is scarcely emarginate and not crenulate but with a row of small tubercles along it, the sides of the front with some small granules, the median part shining and between the antennal tubercles superficially impressed, the impression with some fine irregular rugae; the striae between the eyes broad, the interstriae not interrupted, along the middle with a broad smooth space. Thorax transverse (5.5 : 5), less coarsely and a little less closely punctured than in *lopchuensis*, not at all rugose, along the middle smooth, the posterior angle with an impression; the elytra are less closely and more superficially punctured than in that species, the abdomen also is much less closely punctured. Length 7 mm.

Mussoorie : Mossy Falls. Unique. My collection.

***Osorius alticola* sp. n.**

Of the build of *sikkimensis* Bernhauer and *gardneri* Cameron, but differing from both in several respects. The frontal margin is truncate and strongly crenulate, the declivous front feebly coriaceous, at the sides with a few small granules, the striae between the eyes irregular, the interstriae much interrupted, here and there forming elongate granules. Thorax transverse (7 : 5), as in *gardneri*, constricted at the base as in that species, smooth along the middle, elsewhere with small rather close granules but larger and not so close as in *sikkimensis* but coarser and closer than in *gardneri*: elytra much more finely and less closely punctured than in *sikkimensis*, about as closely but more finely than in *gardneri*: abdomen as in *sikkimensis*. Length 7.75 mm.

Sikkim : Karponang, altitude 10,000 feet (*Hingston*). Type in British Museum (Natural History).

I recorded this insect as *sikkimensis* Bernhauer in 1928, *Ann. Mag. nat. Hist.* (10) 2 : 559.

***Osorius mangpuensis* sp. n.**

Similar to *nilgiriensis* Fauvel in build but blacker, and differing in the following respects: the frontal margin is broader, almost truncate and feebly crenulate, the declivous front at the sides with larger and closer granules, the striae between the eyes much broader, the interstriae more interrupted and with a broad smooth median area, thorax with the puncturation distinctly coarser, the elytra a little more closely punctured. Length 6.2 mm.

Darjeeling district: Ghum, Mangpu. Unique. My collection.

***Osorius fraternus* sp. n.**

Size and build of *frontalis* Fauvel, but differing as follows: the front is less shining, more coriaceous with less distinct punctures, the sculpture between the eyes similar in character but much less marked, the fovea at the posterior angle of the thorax scarcely indicated, the puncturation a little finer; the elytra much less coarsely and less deeply punctured. The whole insect is black with reddish-yellow antennae and legs. Length 5 mm.

Darjeeling: Gopaldhara, altitude 4720-6100 feet (*Stevens*). British Museum (Natural History).

SYNONYMY OF TWO PALAEARCTIC ACRIDID GENERA (ORTHOPTERA)

By B. P. UVAROV, D.Sc., F.R.E.S.

1. (*Plagiophlebis* Houlbert 1927) = *Stauroderus* I. Bolivar 1897 (**syn. n.**).

Houlbert (1927, *Encyc. sci., Thysanoceres, Dermaptères et Orthoptères* 2: 94, 104) has proposed *Plagiophlebis* as a subgenus of *Stenobothrus* Fischer, with two species, *scalaris* Fischer Waldheim and *apricarius* L., characterised by specialised elytral venation. No type has been indicated and I select *Oedipoda scalaris* Fischer Waldheim as such, which makes *Plagiophlebis* a pure synonym of *Stauroderus* I. Bolivar 1897 based on the same type (Kirby 1910, *Syn. Cat. Orth.* 3: 177). The limits and the characters of *Stauroderus* have been clarified by Bey-Bienko (1930, *Izvestia zap.-sibirsk. geograph. Obstch.* 7: 7, 25, sep. reprint).

2. (*Thiopteris* Houlbert 1927) = *Mioscirtus* Saussure 1888 (**syn. n.**).

The genus *Thiopteris* Houlbert (1927, *loc. cit.*: 120, 126) was based on *Oedipoda wagneri* Eversmann 1859 and *O. venusta* Brunner 1853. I select the former as the type, which makes *Thiopteris* a pure synonym of *Mioscirtus* Saussure based on the same type.

REPORT ON A COLLECTION OF EMBIOPTERA FROM TRINIDAD AND GUIANA

By Consett DAVIS, M.Sc.

(New England University College, Armidale, New South Wales.)

A COLLECTION of Embioptera secured by Dr. E. McC. Callan in Trinidad and British Guiana was received for study from Dr. O. W. Richards. Four species are included, representative of four families, of which three are indigenous in the Neotropical Region, the fourth introduced. Two of the species *Clothoda urichi* (Saussure) Davis, *Pararhagadochir trinitatis* (Saussure) Davis have previously been re-described (Davis, 1939c, 1940a) from cotype material (single dried specimens of each species), but the present well-preserved series allows the addition of further details. *Oligotoma saundersii* Westwood, a native of the Indian Region, is now pantropic, spread by human transport. The fourth species is new.

Some of the present series are from colonies from which were bred parasitic wasps (BETHYLIDAE, SCLEROGIBBINAE; Richards, 1939; Callan, 1939). Perusal of the former paper indicates that all localities from which SCLEROGIBBINAE have been recorded are well known as localities for Embioptera. It seems probable that members of this sub-family are exclusively parasitic on Embioptera, the few species which have been bred from known hosts supporting this view (*cf.* also Dodd, 1939).

CLOTHODIDAE Tillyard 1937.

Amer. J. Science **33** : 251. (CLOPHODINAE Enderlein 1909, *Zool. Anz.* **35** : 176 : as sub-family of EMBIIDAE.) Type genus, *Clothoda* Enderlein 1909, *loc. cit.*

Neotropical Embioptera, the males winged, R_{1+5} forked (exceptionally simple by aberration in one or more wings), Cu_1 2- to 4-branched; tenth abdominal tergite undivided or, if divided, processes little prominent; ventral parts of terminalia not markedly asymmetrical, and still retaining some similarity to the larval type; cerci symmetrical, each with two long subcylindrical segments, without echinulation.

Both sexes with two bladders on the plantar surface of the first segment of the hind tarsus.

Clothoda Enderlein 1909, *loc. cit.*

Genotype, *Embia nobilis* Gerstaecker 1888, *Mitt. naturw. Ver. Neuvorpommern u. Rügen* **20** : 1. (Synonym: *Antipaluria* Enderlein 1912, *Coll. zool. Selys-Longchamps* **3** : 63; *cf.* Davis, 1939c : 379-380.)

Characters as for the family.

Clothoda urichi (de Saussure 1896) Davis 1939c.

Proc. Linn. Soc. N.S.W. **64** : 377. *Embia urichi* de Saussure 1896, *J. Trinidad Club* **2** : 293.

♂: Length 10.5-14.0 mm.; general colour dark brown, wings with veins bordered by smoky-brown bands. Head (fig. 1) 2.0-2.6 mm. \times 1.5-2.0 mm.; antennae with up to 21 segments, last three cream, maximum total length 8 mm.; mandibles rather stout, terminal and subterminal teeth subobtusely. Fore-wing 8.0-11.7 mm. \times 2.0-3.0 mm.;

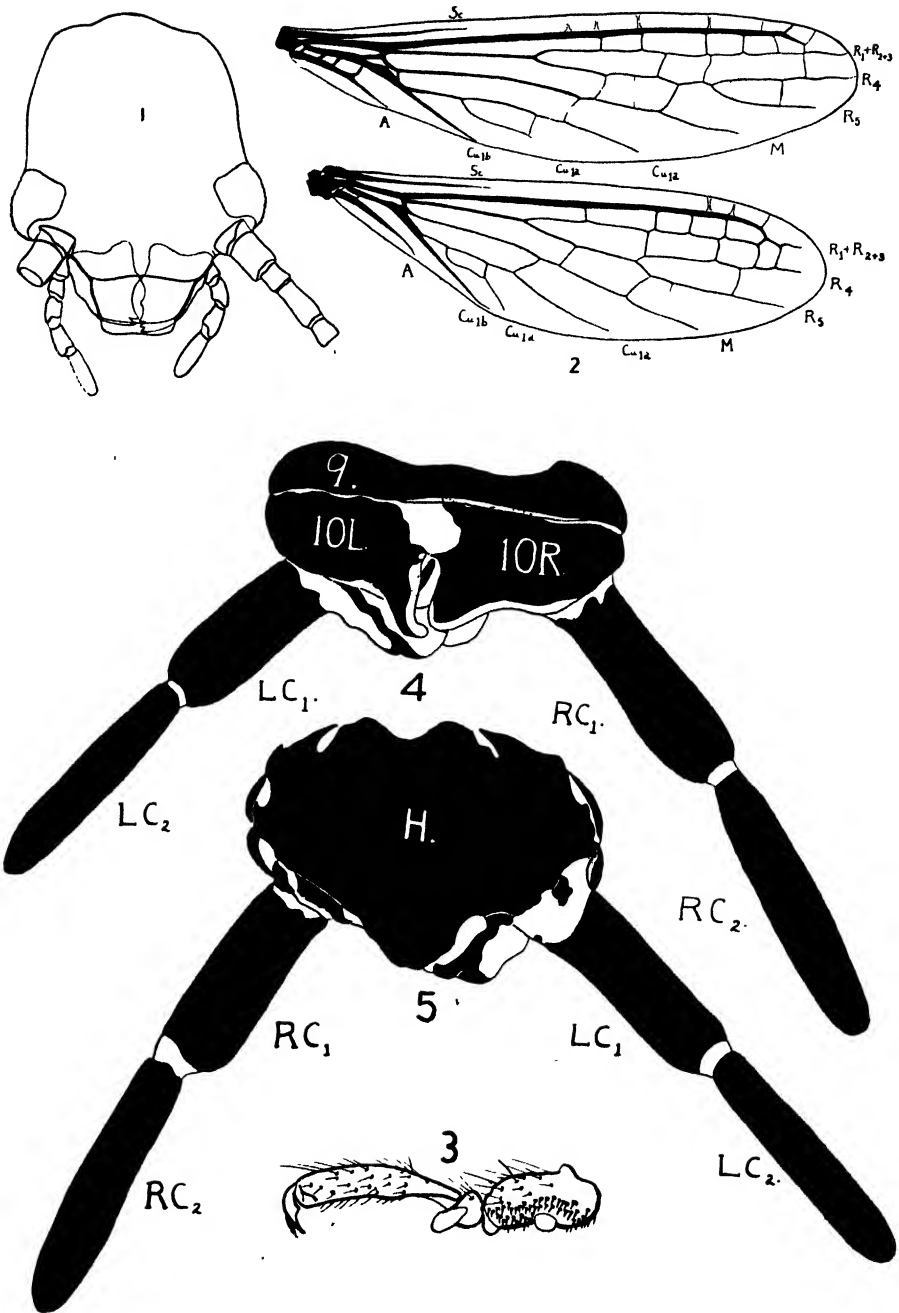
hind-wing 7.0-10.6 mm. \times 2.0-3.0 mm. Venation (fig. 2) somewhat variable (*infra*); R_{4+5} forked, rarely simple in some wings; M simple; Cu_{1a} simple or forked; all veins strongly developed, cross-veins variable in number and position but relatively frequent. Hind tarsi (fig. 3) with two bladders on plantar surface of first segment. Terminalia (figs. 4-5) with ninth abdominal tergite transverse and slightly asymmetrical, tenth abdominal tergite separated by a membranous area into right and left hemitergites, the former subtriangular, the angle between its distal and inner margins representing an obtuse process; distal margin of right hemitergite membranous, inner margin irregular, with a small inwardly-directed spur, connecting to an oblique sclerotised rod sunk in membrane. Region between basal parts of hemitergites more or less membranous in most specimens, sometimes irregularly sclerotised. Inner margin of left hemitergite produced back to a blunt process, terminally curved to the right and upwards, membranous along the right-hand side. Cerci symmetrical, two-segmented, both segments smooth, subcylindrical, the basal one thicker. Ninth abdominal sternite (hypandrium) with sclerotised margins irregular; median posterior process blunt. Two sclerites embedded in membranes between hypandrium and base of right cercus, the inner one slightly hooked terminally, the outer one small (as figured) or sometimes transverse and subannular. These sclerites probably represent the larval right cercus-basipodite and right half of the tenth abdominal sternite. On the left of the distal process of the hypandrium is a blunt membranous lobe, with a median sclerotised area expanded distally, and probably representing the left half of the larval tenth sternite. Between this lobe and the left cercus there may be irregular sclerites embedded in membrane (fig. 5), or, more frequently, most of this region may be sclerotised; this region corresponds to the left cercus-basipodite of the larva.

♀: Length up to 16 mm.; general colour as in the male, the intersegmental membranes of the lateral parts of the abdomen more obvious as pale streaks. Wingless and larviform as throughout the Order.

Localities, TRINIDAD, B.W.I.: Detailed locality not given (de Saussure's types, both sexes, coll. F. W. Urich; Geneva Museum); Port of Spain, coll. Wheeler (1 ♂, 3 ♀; Museum of Comparative Zoology, Harvard University); and the following new records, coll. E. McC. Callan: La Laja, 24.iv.38 (1 ♂, 8 ♀, 11 larvae); Mount St. Benedict, 23.i.38 (2 ♂, 15 larvae); St. Augustine, 18.iii.38 (1 ♂) and 6.i.39 (2 ♂, 20 larvae).

Note: Variability in the branching of the cubitus in Trinidad specimens indicates that *Clothoda intermedia* Davis (1939c: 376; type locality, Caracas, Venezuela) should be reduced to the synonymy of *C. urichi* (Saussure). *C. intermedia* was separated on the 3-branched cubitus, all Trinidad specimens previously seen having two branches only. Amongst the present series, the anterior branch of the cubitus (Cu_{1a}) is forked in all wings in the La Laja specimen; simple in all wings in one Mount St. Benedict specimen, and in the other simple in all except the left fore-wing, where there is a faint trace of an extra branch. Of the three St. Augustine specimens, one has Cu_{1a} forked in the fore-wings, weakly forked in the left hind-wing, simple in the right hind-wing; the second, simple in all wings except the left fore-wing; and the third, simple in all wings, with a weak second anterior branch arising from Cu_{1b} in the right hind-wing.

In view of this variability, even varietal rank cannot be allowed to specimens with a 3-branched cubitus. Should the collection of further extensive series indicate that the cubitus is usually 2-branched in Trinidad specimens, 3-branched in mainland examples, with few exceptions, then the name *intermedia* might be used subspecifically, or perhaps the name *aequicercata* Enderlein might come into use (*cf.* Davis, 1939c: 379).

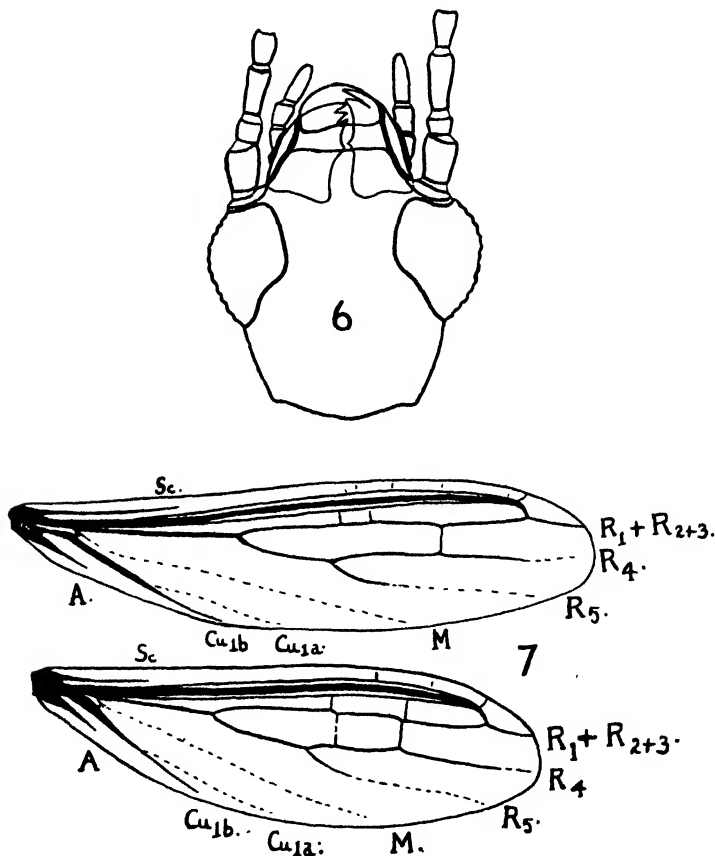


FIGS. 1-5.—*Clothoda urichi* (Saussure), ♂, La Laja, Trinidad: 1, head from above, outline of mandibles indicated, $\times 16$. 2, right fore- and hind-wing, $\times 6$. 3, hind tarsus viewed laterally, $\times 33$. 4, terminalia from above, $\times 33$. 5, terminalia from below, $\times 33$.

EMBIIDAE Burmeister 1839.

Handbuch Ent. 2 : 768 (spelt "Embiidae"). Type genus, *Embia* Latreille 1829, *Le Règne animal* (Édit. 2) : 256.

Indian, Mediterranean, African or Neotropical Embioptera, the males (if winged) with R_{4+5} forked; with the tenth abdominal tergite clearly divided to hemitergites, the latter with prominent processes; the left cercus two-segmented, the first segment clavate and echinulate, the second subcylindrical, distinctly sutured from the first.



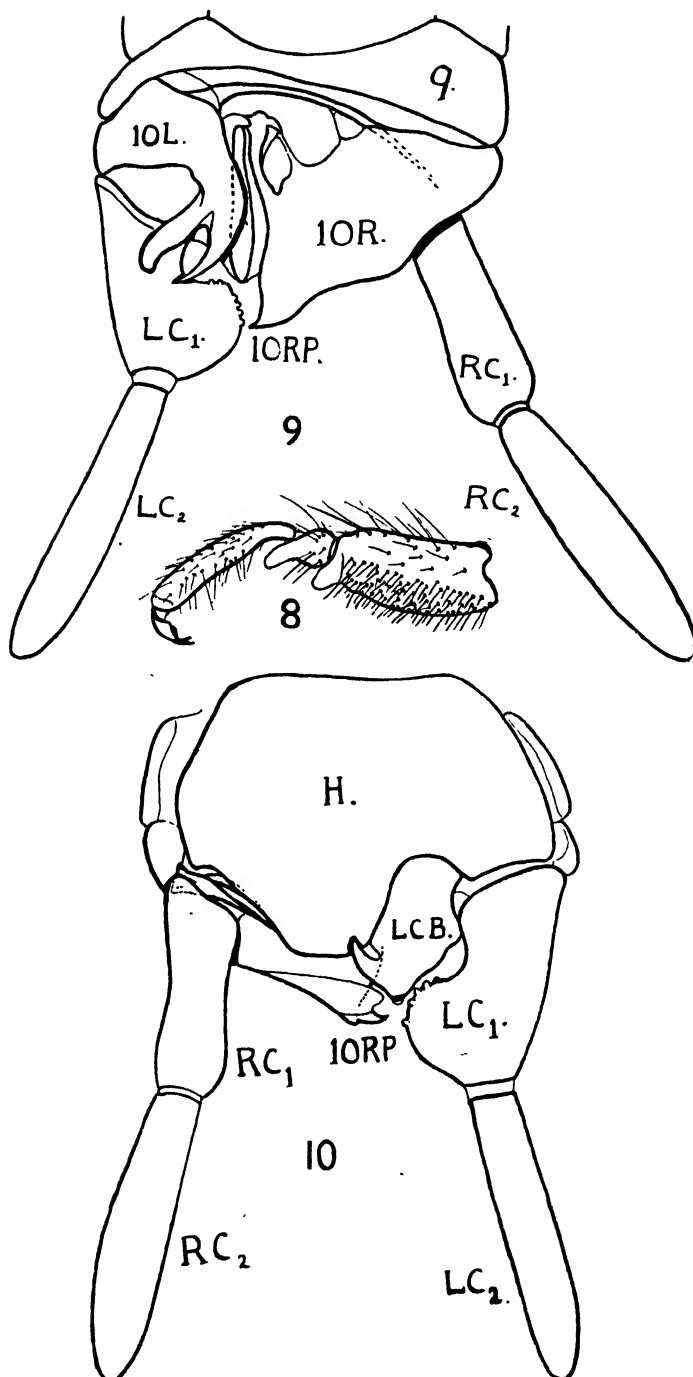
FIGS. 6, 7.—*Pararhagadochir trinitatis* (Saussure), ♂. Structures corresponding with figs. 1 and 2; 6 × 33, 7 × 131.

Pararhagadochir Davis 1940a.

Proc. Linn. Soc. N.S.W. 65 : 181. Genotype, *Embia trinitatis* de Saussure 1896, *op. cit.* : 293.

Neotropical Embioptera, the males winged, R_{4+5} forked, R_5 , M, and Cu_{1a} simple, weak; terminalia with process of left hemitergite markedly bifid; inner margin of right hemitergite running forward from distal extremity towards ninth abdominal tergite as a sclerotised rod, from near the end of which arises an oblique bar embedded in membrane.

Both sexes: First segment of hind tarsus usually without a medial bladder on the plantar surface.



FIGS. 8-10.—*Pararhagadochir trinitatis* (Saussure), ♂, St. Augustine, Trinidad. Corresponding structures to figs. 3-5 respectively; 8-10, $\times 70$.

Pararhagadochir trinitatis (de Saussure 1896) Davis 1940a.

Op. cit. : 182. *Embia trinitatis* de Saussure, *loc. cit.*

♂ : Length 6.5–8.7 mm.; general colour dark brown, prothorax cream, wing-bands smoky-brown. Head (fig. 6) 1.2–1.4 mm. \times 0.9–1.1 mm.; eyes relatively large, sub-reniform; antennae with up to 23 segments, maximum total length 4 mm.; mandibles rather slender, the left with three acute incurved teeth terminally and subterminally on inner face, the right with two. Fore-wing 5.2–7.0 mm. \times 1.3–1.6 mm.; hind-wing 4.8–5.9 mm. \times 1.3–1.7 mm. Venation (fig. 7) as throughout genus. Hind tarsus (fig. 8) with plantar surface of first segment evenly clothed with stiff setae, except for a small terminal bladder. Terminalia (figs. 9–10) : Ninth abdominal tergite short, asymmetrical, narrower on left-hand side; tenth abdominal tergite completely cleft, hemitergites widely separated by membrane but joined by a thin transverse basal bar. Right hemitergite subtriangular, produced inwards and backwards to an acute process, below and slightly anterior to which is a blunt membranous flap. Inner margin of right hemitergite produced forward from distal process almost to ninth tergite as a thin sclerotised rod, hooked at end; a membranous flap is attached near this hook, with a median sclerotised bar running obliquely back and to the left and terminally closely approximated to the left cercus-basipodite. Left hemitergite small, produced inwards and then curving back as a bifid process, the right-hand lobe curved to the left, acute and heavily sclerotised, the left-hand lobe less heavily sclerotised, subobtuse, terminally curved slightly to the right. Hypandrium with an obtuse distal process to the right of the mid-line; distal margin excavate to the left of this process, excavation filled by the flat left cercus-basipodite, which terminally curves to the right and forward to form a subacute process underlying the process of the hypandrium. First segment of left cercus with a rounded echinulate lobe directed inwards and slightly forwards; second segment elongate-cylindrical. Right cercus with two elongate cylindrical segments; two small sclerites between base of first segment and right-hand part of distal margin of hypandrium, the outer one transverse, tapered towards the left (?true right cercus-basipodite), the inner one small and fused to the hypandrium (?right half of larval tenth sternite).

♀ : Length 6.5–9.8 mm., head 1.2–1.5 mm. \times 1.0–1.5 mm.; general colour as in the ♂; wingless and larviform as throughout the Order.

Localities, TRINIDAD, B.W.I. : Detailed locality not given (de Saussure's type series, both sexes, coll. F. W. Urich; Geneva Museum); St. Augustine, coll. N. A. Weber (1 ♂; Museum of Comparative Zoology, Harvard University); and the following new records, coll. E. McC. Callan : St. Augustine, 17.i.38 (2 ♂, 12 ♀, 24 larvae), 25.iii.38 (3 ♂, 7 ♀, 10 larvae; SCLEROGIBBINAE bred from colony) and 19.ii.39 (1 ♂, together with a long series of larvae belonging probably to *Clothoda urichi* (Saussure)).

OLIGEMBIIDAE Davis 1940b.

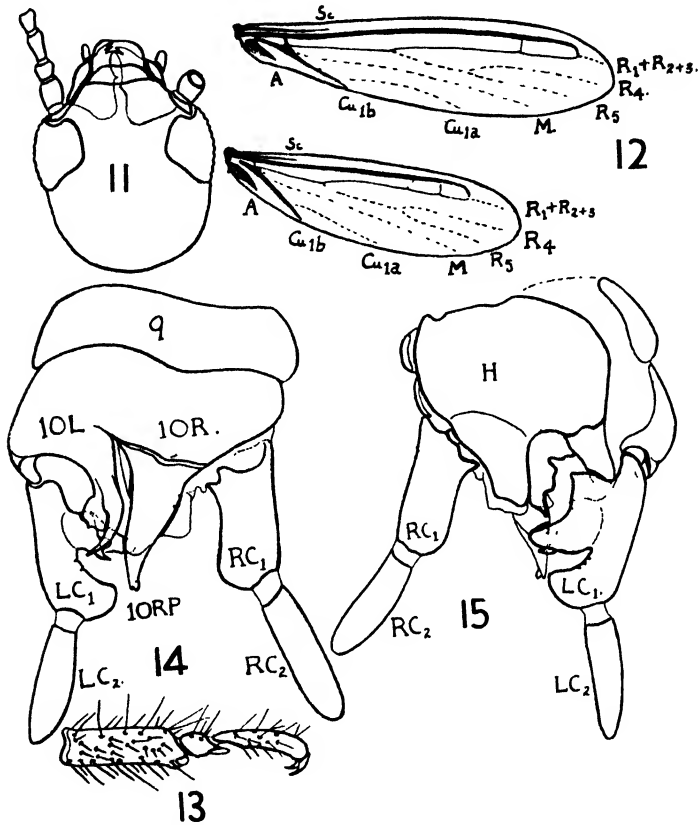
Ann. ent. Soc. Amer. 33 : 680. Type genus, *Oligembia* Davis 1939b, *Proc. Linn. Soc. N.S.W.* 64 : 217.

Very small Neotropical Embioptera, the males winged, with only the veins R_1 and Cu_{1b} well developed, but with R_{4+5} forked, R_{2+3} , M, and Cu_{1a} (as indicated by pigment-bands and rows of macrotrichia) simple; tenth abdominal tergite not completely cleft to base; structures at base of left cercus complex; first segment of left cercus subcylindrical to clavate, but never echinulate, second segment and both segments of right cercus subcylindrical.

Oligembia Davis 1939b.

Loc. cit. Genotype, *Oligotoma hubbardi* Hagen 1885, *Canad. Ent.* 17 : 142.

OLIGEMBIIDAE with the process of the left hemitergite of the male terminalia complex, and the base of the left cercus having an inner lobe affixed. First segment of hind tarsus without medial ventral bladder, terminal bladder small or wanting.



FIGS. 11-15.—*Oligembia intricata* sp. n., holotype ♂; corresponding structures and magnifications to figs. 6-10 respectively.

(Setae omitted except in figures of tarsi. All figures based on camera lucida outlines, or prepared with a projection drawing-apparatus.

9, ninth abdominal tergite; 10L, 10R, left and right hemitergites of tenth abdominal tergite; H, hypandrium; LC_1 , LC_2 , RC_1 , RC_2 , first and second segments of left and right cerci respectively; LCB, structure conventionally referred to as left cercus-basipodite; 10RP, posterior process of 10R.)

Oligembia intricata sp. n.

♂: Length 5.0 mm; general colour dark brown, eyes black, wing-bands pale brown. Head (fig. 11) 1.0 mm. \times 0.8 mm., eyes not prominent, head outline behind eyes semi-circular; antennae incomplete; mandibles with outer margin irregular, inner margin with a blunt median tooth, and acute terminal and subterminal teeth, the left with three, the right two. Fore-wing 4.0 mm. \times 0.9 mm., hind-wing 3.2 mm. \times 0.9 mm.; venation (fig. 12) as throughout genus. Hind tarsus (fig. 13) with first segment slender, cylindrical,

with a minute terminal ventral bladder sunk in a recess of the sclerite of the segment; setae not numerous. Terminalia (figs. 14-15) very complex; tenth abdominal tergite only slightly divided by an oblique cleft running forward and to the left from the mid-point of its distal margin; right-hand part produced back to a narrow, evenly-tapered process, whose sclerotisation is not basally continuous with the hemitergite; margins of process slightly crenulate, termination subobtusate, with a minute subglobular lobe subterminally on the right and extending just beyond the end of the main process. Inner margin of process basally overlying a small obtuse membranous flap. Left-hand extremity of distal margin of left hemitergite curved back and to the right as a rounded condyle for the articulation of the left cercus. Process of left hemitergite bifid, right-hand lobe slender, acute, heavily sclerotised, terminally curved to the left; left-hand lobe more ventral in origin, flat, spathulate, more or less membranous, distal margin with a subacute median tooth. First segment of left cercus obtusely clavate, inner margin medially concave and slightly crenulate; base of cercus carrying an intimately-fused inner lobe (?left cercus-basipodite), obtusely tapered at free (right-hand) end; half-way along this lobe is an oblique dorsal ridge, the distal end of which is formed into an up-curved acute tooth, the middle region into a spherical knob. First segment of right cercus very weakly clavate, basal articulation irregular; second segment of each cercus subcylindrical. Hypandrium subquadrate, right-hand part of distal margin produced back as a tapered tongue-like process, weakly bilobed terminally; on the left of this process is a longitudinal plate (?left half of larval tenth sternite), terminally obliquely truncate, left-hand margin irregular. Between this plate and the lobe attached to the base of the left cercus is another weakly-sclerotised lobe, running back from the left latero-distal angle of the hypandrium to terminate in a rounded extremity above the inner lobe at the base of the cercus.

♀ unknown.

Locality: "BRITISH GUIANA, Mile 18, Bartica-Potaro road," 10.iv.38, coll. E. McC. Callan (holotype ♂).

This species belongs to the series, perhaps subgenerically distinct, which includes *Oligembia banksi* Davis (1939b : 221) and *O. pacifica* Ross (1940 : 640); the former was described from Paraguay, the latter from Tres Marias Islands, off the west coast of Mexico. It agrees with both in the generic structure of the processes of the hemitergites, but differs from both in the presence of only one acute tooth on the process at the base of the left cercus, and in the outline of the remainder of the left cercus and its basal sclerites.

OLIGOTOMIDAE Enderlein 1909.

Op. cit. : 190. Type genus, *Oligotoma* Westwood 1837, *Trans. Linn. Soc. Lond., Zool.* 17 : 373.

Embioptera indigenous in the Oriental, Australian and Mediterranean Regions, the male terminalia having the tenth abdominal tergite incompletely cleft, the hemitergites being in contact basally; the outer of the right hemitergite produced back as a long thin sclerotised process, which basally overlies an obtuse medial flap, the latter having a medial sclerotisation continuous with that of the outer process; left hemitergite with a prominent process; left cercus with first segment subcylindrical to clavate but never echinulate. Wings, when present, with R_{4+5} , M, and Cu_{1a} simple and very weakly developed.

Oligotoma Westwood 1837.

Loc. cit. as subgenus of *Embia* Latreille 1829. Raised to generic rank, Burmeister 1839, *loc. cit.* Genotype, *Oligotoma saundersii* Westwood 1837, *loc. cit.*

Oriental or Australian OLIGOTOMIDAE (now pantropic, spread by human transport), the first segment of the hind tarsus in both sexes without a median ventral bladder.

Oligotoma saundersii Westwood 1837, *loc. cit.*

This pantropic species, indigenous in the Indian Region, has been re-described from the type, and its distribution and extensive synonymy discussed (Davis, 1939a). The male terminalia are easily distinguishable from those of all other species by the presence of a curved spine, which arises subterminally from the left-hand margin of the hypandrium, and curves under the hypandrium to the right and, terminally, upwards beside the right-hand margin of the hypandrium.

Additional Localities : TRINIDAD, B.W.I. : St. Augustine, 19.iii.38, E. McC. Callan (1 ♂, 2 ♀, 3 larvae). BRITISH GUIANA : Coverden, Demerara River, 15.iv.38, E. McC. Callan (1 ♂, 4 larvae).

Note : From the series recorded above, the following have been placed in the Macleay Museum, Sydney University : *Clothoda urichi* (Saussure), ♂, ♀, La Laja, Trinidad; ♂, Mount St. Benedict, Trinidad. *Pararhagadochir trinitatis* (Saussure), ♂, ♀, St. Augustine, Trinidad.

The remainder are being returned to Dr. O. W. Richards, representative specimens, including the holotype of *Oligembia intricata*, to be deposited in the British Museum (Natural History). Owing to war conditions, these specimens have been placed for temporary safe-keeping in the Australian Museum, Sydney.

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THE RACES AND FORMS OF *MAHATHALA AMERIA* (HEWITSON) LEP. RHOP.

By G. TALBOT, F.R.E.S.

(WITH ONE TEXT-FIGURE.)

THE genus *Mahathala* Moore is, apparently, a monotypical one. The forms of *ameria* Hewitson appear to be separated geographically, and in the structure of the ♂ genitalia no obvious differences are found. The distinct forms represented by *angulata* (Leech), *ameria* (Hewitson), and *zistra* Fruhstorfer were dissected.

When examining the type of *zistra*, to confirm the sex, I became doubtful, although the insect was described as a female and resembled one in facies. Dissection proved it to be a male and the existence of two species appeared possible. However, on the available data and genitalia comparisons, I conclude that only one species exists. More information is desirable as to the true range of the subspecies *ameria* (Hewitson).

To determine the sexes without dissection the fore tarsus should be examined and compared with the accompanying figures, kindly prepared by Dr. A. S. Corbet. The male tarsus is composed of a single segment furnished with a number of bristles; the distal extremity is rounded. The female tarsus is fully developed with five segments; the terminal segment is furnished with two well-developed claws; all the segments bear numerous bristles.

M. ameria (Hewitson) is known from China, Formosa, Hainan, Yunnan, Assam, Eastern Bengal, Burma, Siam, Malaya, Sumatra, Java.

Eight subspecies are distinguished of which two, including a form, are herein described as new. They are enumerated below and a key to their identification is appended.

All the material dealt with in this paper is in the British Museum (Natural History), and I am grateful to the Trustees for enabling me to study it.

(1) *Mahathala ameria angulata* (Leech).

Amblypodia angulata Leech, 1890, *Entomologist* **23** : 44 (♀, Changyang).

Habitat.—Western and Central China. Holotype ♀ in British Museum from Changyang, also 1 ♂, 1 ♀ from Moupin.

(2) *Mahathala ameria gone* Druce.

Mahathala gone H. H. Druce, 1895, *Proc. zool. Soc. Lond.* **1895** : 593 (Mongolia).

This subspecies is nearest to *angulata* (Leech). It is represented in the British Museum only by the unique type, a ♀.

Habitat.—Mongolia, 1 ♀.

PROC. R. ENT. SOC. LOND. (B) 11. PT. 8. (AUGUST 1942.)

(3) *Mahathala ameria kiangana* subsp. n.

♂. *Upperside* of fore-wing with black border slightly wider than in the Burmese subspecies, and less so than in *angulata*. Hind-wing border as on fore-wing but widened posteriorly, though less wide than in *angulata*; the blue colour extends into area 6 in a thin streak, and below vein 2 only reaches the fold in area 1c.

Underside with grey markings more sharply defined than in the Burmese subspecies. Hind-wing without a distinctly defined basal darker brown area.

♀. *Upperside* blue areas much reduced and duller compared with the Burmese subspecies. Fore-wing blue usually not extended into area 4, and hind-wing blue only extended slightly beyond the cell.

Underside as in the ♂.

Habitat.—CHINA: Kiang-Si (*C. Bock*, 1894), 2 ♂♂, 6 ♀♀ (ex Coll. Oberthür) (types); Ku Shan, 2.xi.1886. 1 ♂; Foochow (*de la Touche*), 1 ♂, 1 ♀; ASSAM: Dausin Valley, vi.1889 (*Doherty*), 1 ♀; BENGAL: Chittagong, 3.viii.1890 (*H. M. Parish*), 1 ♀.

Mahathala ameria kiangana f. *umbrina* form. n.

♂. *Upperside* as in *kiangana*. *Underside* as in the subspecies from Lower Burma, with contrasting grey markings.

♀. *Upperside* of fore-wing with blue area extended slightly into areas 4 and 5. Hind-wing blue slightly more extended than in *kiangana*, but to a much less extent than in the Burmese subspecies.

Underside similar to the ♂. In two specimens from Maymyo the hind-wing bands are strongly marked as in *kiangana*, but are more grey.

Habitat.—ASSAM: Nichuguard, v.1914 (ex Coll. Tytler), 2 ♀♀. BURMA: Upper Shan States, Maymyo, July and September (ex Coll. Tytler), 3 ♂♂, 2 ♀♀ (types); "Burma," 1 ♀.

(4) *Mahathala ameria hainani* Bethune-Baker.

Mahathala hainani Bethune-Baker, 1903, *Trans. zool. Soc. Lond.* 17 : 23, pl. i, fig. 1 (♀) (Hainan, 2 ♀♀).

Mahathala ameria formosa Fruhstorfer, 1908, *Ent. Z.* 22 : 49 (Formosa, Kanshirei, 1 ♀).

Habitat.—Formosa, 3 ♂♂, 7 ♀♀, with holotype ♀ of *formosa*. Hainan, 1 ♂, 4 ♀♀. YUNNAN: Teng-Yueh-Ting, 2 ♂♂, 4 ♀♀.

(5) *Mahathala ameria ameria* (Hewitson).

Amblypodia ameria Hewitson, 1862, *Cat. Lyc. Brit. Mus.* : 14, pl. viii, figs. 85, 86 (♀, non ♂) (N. India, Siam).

Mahathala ameria Swinhoe, 1911, in Moore, *Lep. Indica* 8 : 141, pl. 671, fig. 3a (♂, non ♀) (Calcutta).

Mahathala ameria zistra Fruhstorfer, 1908, *Ent. Z.* 22 : 49 (Siam, Muok-Lek, 1000 feet, January, 1 ♂, non ♀).

A close comparison of Hewitson's type (a ♀) with all specimens of the comparatively large series of *ameria* now assembled in the British Museum, shows it to agree, and to be almost identical, with a female established as belonging to *zistra* Fruhstorfer.

Habitat.—Eastern Bengal; Siam.

♂ neallotype, the specimen figured by Swinhoe (1911), now in the British Museum. ♀ holotype, "India"; "India," 1 ♂ (ex Coll. Joicey), 1 ♂ (ex Coll.

Boisduval); Calcutta, 1 ♂ (ex Coll. W. H. Evans), 1 ♀ (ex Coll. Elwes); Tippera (Comilla), E. Bengal, 1 ♂ (*H. M. Parish*); holotype ♂ of *zistra* Fruhstorfer, Siam.

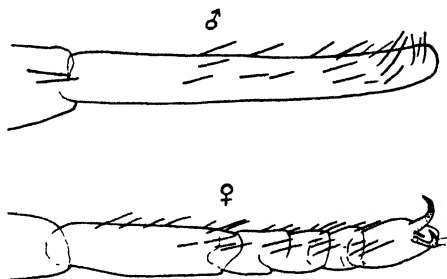


FIG. 1.—*Mahathala ameria ariadeva* Fruhstorfer, tarsus of fore leg, ♂♀.

(6) *Mahathala ameria burmana* subsp. n.

♂. *Upperside* of fore-wing with marginal dark border narrow, not over 1 mm. wide. Hind-wing blue area extending well into area 6, and posteriorly reaching vein 1a.

Underside of hind-wing with ground-colour usually much darker than in the nominotypical subspecies, the dark grey bands usually contrasting strongly; a well-defined basal darker brown area; post-discal band, crossing the distal brownish-grey area, narrow, greyish-black, and usually obscure; submarginal lunulate line obsolete or obscure.

♀. *Upperside* with extensive blue area, much brighter than in the ♂; fore-wing blue extending well into area 4 and usually into 5; black border below vein 4 about 3 mm. wide, the hind-wing border being of similar width.

Underside as in ♂.

Habitat.—MIDDLE TO SOUTHERN BURMA: Karen Hills, Ataran, Pegu, Tavoy, etc., a series of both sexes. Western Siam, 6 ♂♂; "Siam," 1 ♀ (paratype of *ameria*, ex Coll. Hewitson).

Types (♂♀): Ataran, Haungthraw Valley, December, 1924 (♂), January, 1925 (♀) (ex Coll. W. H. Evans).

(7) *Mahathala ameria ariadeva* Fruhst.

Mahathala ameria ariadeva Fruhstorfer, 1908, *Ent. Z.* 22 : 49 (= *ameria* Distant, *Rhop. Malay* : 268-269, pl. xxxi, fig. 30, ♀, Perak).

Habitat.—Malaya; Sumatra. A series of both sexes, including the ♀ which appears to have served for Distant's figure (*loc. cit.*) and is therefore the holotype. ♂ neallotype, here selected, from Perak, July and August, 1895 (ex Coll. Oberthür), being specimen dissected (slide no. 7).

(8) *Mahathala ameria javana* Fruhst.

Mahathala ameria javana Fruhstorfer, 1908, *Ent. Z.* 22 : 49 (East Java, 1 ♂, 8 ♀♀).

Mahathala ameria Piepers & Snellen (*non* Hew.), 1918, *Rhop. Java* : 67, pl. xxiii, figs. 95a, b (♂♀, East Java).

Allied to *ariadeva* Fruhst. The blue colour of the ♀ is much brighter than in other forms.

Habitat.—Eastern Java, 1 ♂, 6 ♀♀, including the types. The ♂ appears to be very rare.

Key to subspecies of *Mahathala ameria* (Hewitson).

Males.

1. Fore-wing strongly incurved below apex. Underside of hind-wing with basal black spots in area 1c *angulata* (Leech).
Fore-wing not strongly incurved below apex. Underside of hind-wing without basal black spots in area 1c 2.
2. Upperside of fore-wing marginal dark border at vein 3 less than 1 mm. to 1.5 mm. wide 3.
Upperside of fore-wing marginal dark border at vein 3 from 3 to 6 mm. wide 6.
3. Underside of hind-wing without a submarginal black lunulate line or row of defined spots 4.
Underside of hind-wing with a submarginal black lunulate line or with a row of distinctly-defined black spots 5.
4. Underside of hind-wing without a defined basal dark area; darker bands sharply defined *kiangana* Talbot.
Underside of hind-wing with basal darker area; dark grey bands strongly contrasted *burmana* Talbot.
5. Underside of hind-wing without a distal grey border; pale bands sharply defined *ariadeva* Fruhstorfer.
Underside of hind-wing with distal broad grey border; the post-discal dark band well defined *javana* Fruhstorfer.
6. Upperside of fore-wing marginal black border at vein 3 6 mm. wide.
Underside of hind-wing without light mottlings, often leaden grey in distal area *hainani* Bethune-Baker.
Upperside of fore-wing marginal black border at vein 3 3 mm. wide.
Underside of hind-wing not mottled; a post-discal narrow grey band about 1.5 mm. wide; a submarginal pale band, about 2 mm. wide, defined by scattered black scaling *ameria* (Hewitson):

Females.

1. Fore-wing strongly incurved below apex. Underside of hind-wing with basal black spots in area 1c 2.
Fore-wing not strongly incurved below apex. Underside hind-wing without basal black spots in area 1c 3.
2. Upperside hind-wing blue area faint, extending very slightly beyond cell and neither above nor below it *angulata* (Leech).
Upperside hind-wing blue area extending to about 4 mm. beyond cell and well into areas 2 and 3 *gone* Druce.
3. Upperside fore-wing blue not extending into areas 4 or 5 4.
Upperside fore-wing blue extending into areas 4 or 5 5.
4. Underside hind-wing with distinct submarginal grey spots *kiangana* Talbot.
Underside hind-wing very dark, without light submarginal spots *hainani* Bethune-Baker.
5. Upperside hind-wing blue to from 3 to 5.5 mm. beyond cell 6.
Upperside hind-wing blue to from 6 to 7.5 mm. beyond cell 7.
6. Upperside fore-wing bright blue. Hind-wing blue to 5 or 5.5 mm. beyond cell *burmana* Talbot.
Upperside hind-wing blue to 3 mm. beyond cell *ameria* (Hewitson).
7. Upperside hind-wing blue to 7 or 7.5 mm. beyond cell. *ariadeva* Fruhstorfer.
Upperside hind-wing blue to about 6 mm. beyond cell. Fore-wing blue very bright. Underside hind-wing a distal broad grey area and dark basal half *javana* Fruhstorfer.

A KEY TO THE SPECIES OF *CYPHICERINUS* MARSHALL

By Sir Guy A. K. MARSHALL, K.C.M.G., F.R.S.

WHEN this Curculionid genus was described in 1928 (*Ann. Mag. nat. Hist.* (10) 2 : 538, f. 1) it comprised only four species; now nine species are known, three new ones being described below. They form a homogeneous group, dull in colouring and of very similar facies. Nothing is known of the habits beyond the fact that *tectonae* Marshall has been recorded as defoliating teak trees in the Central Provinces, India, and *venalis* Faust has been found in some numbers feeding on the leaves of *Cordia myxa* in Burma. The genus ranges throughout India to Burma and also occurs in the Andamans, but not in Ceylon. An isolated species is known from the Philippines, but although fairly large collections have been examined from Malaya and Indo-China, the genus has not so far been found in those territories, though it probably occurs there. In describing his species *nepalensis* and *appendicinus*, which he placed in the genus *Cyphicerus* Schönherr, Faust stated that they were closely allied to the Japanese *Canoixus japonicus* Roelofs, and sank the genus *Canoixus* as a synonym of *Cyphicerus*. Actually, the two genera are quite distinct. *Canoixus* having the rostrum very differently constructed, and it cannot even be retained in the EREMNIINAE because it has multisetose mandibles, whereas all the Eremnines have trisetose mandibles (see 1942, *Ann. Mag. nat. Hist.* (11) 9 : 2). The types of the new species are deposited in the British Museum.

Key to the species of *Cyphicerinus*.

- 1(16). Elytra without tubercles, shoulders not projecting laterally; disk of pronotum coarsely punctate; joint 2 of antennal club transverse, or at most as long as broad.
- 2 (3). Rostrum with a median carina anteriorly which becomes converted behind into a stria that ascends the forehead and merges into the frontal fovea (Central Provinces, Bihar and Madras Pres.)
tectonae Marshall.
- 3 (2). Base of rostrum without any continuous median stria, frontal fovea isolated or absent.
- 4(13). Elytra with intervals of even height and without a posterior callus.
- 5(10). Dorsal area of rostrum with two carinae on each side (the outer one sometimes indistinct) and immediately adjoining the external one a parallel longitudinal sulcus running straight to upper half of eye.
- 6 (9). Scape with sparser suberect setae; dorsal area of rostrum with a median carina and not concave at base.
- 7 (8). Intervals on elytra with more numerous irregular setae, scales narrow; dorsal area of rostrum flat; prothorax of equal width at base and apex; elytra of ♀ without an apical process (Bihar, Madras Pres.)
hirsutus Desbrochers.
- 8 (7). Intervals on elytra with a single row of setae, scales broadly ovate or nearly round; dorsal area of rostrum depressed in front; prothorax narrower at base than at apex; elytra of ♀ with a short sharp apical process (Philippines)
appendicinus Faust.
- 9 (6). Scape with denser subrecumbent setae; dorsal area of rostrum concave throughout, without any median carina but only a very shallow median stria; elytra of ♀ with a short sharp apical process (Bombay Pres.)
simus sp. n.
- 10 (5). Dorsal area of rostrum with only a single carina on each side, the lateral sulcus oblique and directed towards lower half of eye; setae on scape subrecumbent, those on elytra numerous, irregular and very short.

- 11(12). Rostrum with dorsal area shallowly impressed in front, setae erect; forehead flat transversely; scales on elytra narrow (Burma) *venalis* Faust.
- 12(11). Rostrum with dorsal area deeply impressed in front, setae recumbent; forehead convex; scales on elytra almost round (Andamans) *andamanicus* sp. n.
- 13 (4). Elytra with intervals 3 and 5 more raised in parts, with a posterior callus.
- 14(15). Rostrum not striolate dorsally; forehead with a distinct median fovea; scape with stiff erect setae; elytra without an oblique sub-basal depression (Nepal, Sikkim, Bihar, Assam) . . . *nepalensis* Faust.
- 15(14). Rostrum striolate; forehead without any fovea; scape with subrecumbent setae; elytra with an oblique depression from near shoulder to suture at one-fourth from base (Burma) . . . *undulans* Marshall, 1941.
- 16 (1). Elytra with numerous small tubercles, shoulders projecting laterally; joint 2 of antennal club longer than broad, especially in ♂ (3 : 2); disk of pronotum granulate (Bombay) . . . *lesnei* sp. n.

Cyphicerinus simus sp. n.

♀. Derm piccous black, with dark brown scales and vague markings formed of paler yellowish scales, sometimes with a coppery reflection; pronotum with a broad indefinite median stripe of rather sparse coppery scales; elytra with sparse spots of pale scales, some of which form an indefinite band at one-fourth from base and a broader one behind middle.

Head flattened transversely between the eyes, with obsolescent punctures and sparse coppery scales, the frontal fovea round and deep. *Rostrum* a little shorter than its width at the genae (8 : 9); dorsal area broadly concave throughout, without any median carina but only a very shallow abbreviated stria, its lateral margins bounded by a sharp carina, closely adjoining which externally is a lower obtuse carina, and beyond this a parallel deep sulcus running straight to the upper half of the eye, the transverse ridge behind the epistome well marked and not interrupted. *Antennae* with dense recumbent setae on the scape, the two basal joints of the funicle equal. *Prothorax* of equal width at base and apex, almost parallel-sided, only very slightly rounded laterally in the middle, postocular lobes strongly developed and without vibrissae; dorsum with dense rugose punctures and a round post-median impression on each side; setae recumbent. *Scutellum* with dense narrow coppery scales. *Elytra* with rounded rectangular shoulders, widest behind the middle, each with a short sharp apical process in ♀; striae with large round punctures to beyond the middle, the intervals of equal height, about as wide as the striae dorsally, with sparse small irregular granules, each bearing a recumbent spatulate seta.

Length 5.0 mm., *breadth* 2.5 mm.

BENGAL : Chapra, 1 ♀ (*Mackenzie*).

Distinguished from all its congeners by the entirely concave dorsal area of the rostrum, which has no median carina. The only other species that has an apical process on the elytra in the ♀ is *appendicinus* Faust, from the Philippines, which may be distinguished by the prothorax being narrower at the base than at the apex, and by the intervals of the elytra having only a single row of erect setae.

Cyphicerinus andamanicus sp. n.

♂♀. Derm piceous black or brown, with rather thin greyish-white scaling; prothorax with a narrow pale median stripe; elytra with thin pale scaling on the basal third, followed by a broad subdenuded area, and then a distinct transverse band at the top of the declivity of dense pale scales, its posterior margin being more or less sinuate on each elytron, and the apical area with indefinite pale markings.

Head rather strongly convex transversely between the eyes, shagreened, impunctate, with a deep round median fovea. *Rostrum* as long as its basal width, narrowing rapidly in

front, the re-entrant angle behind the genae being rather sharper than in its congeners and forming almost a right angle; the dorsal area convex at the base but deeply impressed in front, with a low median carina (sometimes evanescent or obsolete), the parallel lateral margins with a single carina, the anterior transverse ridge indefinite, being interrupted in the middle by a fovea; the lateral areas with a short deep curved sulcus directed towards the lower half of the eye and sometimes one or two striae above it. *Antennae* with the scape very stout and with recumbent setae; funicle with joint 2 longer than 1, 7 not or but slightly longer than 6. *Prothorax* moderately rounded laterally, widest at about the middle, postocular lobes well developed and with short vibrissae; dorsum with close deep punctures, the two postmedian impressions round and deep. *Scutellum* with fairly dense narrow pale scales. *Elytra* with roundly rectangular shoulders, parallel-sided in ♂, wider behind middle in ♀, with broad striae containing deep round punctures; intervals convex, of equal height, not narrower than the striae, with irregular minute granules bearing short recumbent scale-like setae; the pale scales almost round.

Length 4.5–6.0 mm., breadth 2.2–3.0 mm.

ANDAMAN IS. : 10 ♂, 12 ♀ (*Capt. Wimberley, Roepstorff*).

The bisinuate postmedian pale band on the elytra is rather characteristic of this species, which is nearly allied to *nepalensis* Faust; but the latter differs in having the forehead almost flat and with shallow punctures; the rostrum has no trace of a median carina, but usually a shallow stria, the genae are less dilated and the angle behind them wider; the scape bears erect setae; and intervals 3 and 5 on the elytra are more raised.

Cyphicerinus lesnel sp. n.

♂♀. Derm black, with rather sparse, light brown or yellowish scaling, the elytra with a very indefinite paler band at one-fourth from base and another more distinct one across the top of the declivity reaching to stria 8.

Head transversely flattened between the eyes, shagreened, impunctate, with a round median fovea. *Rostrum* a little longer than its basal width, rapidly narrowed from base to scrobes, abruptly dilated at apex; the dorsal area concave, except near the base, deeper in front, with a feeble median carina in both sexes, the anterior transverse ridge angulated, the lateral margins with a single carina, diverging posteriorly; the lateral areas with a broad shallow sulcus reaching about half-way to the middle of the eye. *Antennae* with the scape stout, bearing stiff erect setae; funicle with the two basal joints equal, 7 equal to 6; club very long and narrow, especially in ♂. *Prothorax* feebly rounded laterally, widest at the middle, the postocular lobes strongly developed, with short vibrissae; dorsum with a shallow transverse impression near the apical margin, granulate in the middle of the disk, granulo-punctate laterally, with the usual two round postmedian impressions. *Scutellum* with fairly dense narrow pale scales. *Elytra* widening behind the middle in both sexes, with the shoulders obtusely projecting laterally, the apices obliquely truncate in ♀ and without any process; striae with deep round punctures, the intervals with sparse minute granules and the following tubercles: interval 1 with an elongate one at the top of the declivity; 3 with a large elongate one (the largest of all) near base, a small one at middle, and three or four behind this diminishing posteriorly; 5 with a small one before middle and two to five smaller behind it; tubercles all clothed with dense broad scale-like setae, the remaining setae narrower, recumbent and inconspicuous; the pale scales broadly ovate or almost round, the dark ones narrower.

Length 5.5–6.0 mm., breadth 2.5–3.0 mm.

BOMBAY PRES. : Bombay, 1 ♂, 1 ♀ (*Fontanier*).

A very distinct species on account of the tuberculate elytra; in addition to the characters given in the key, the rostrum is rather longer and more rapidly narrowed anteriorly than in the other species.

REVISIONAL NOTES ON MELANESIAN *EUPLOEA* (LEP.) WITH DESCRIPTIONS OF NEW SUBSPECIES AND FORMS

By Professor G. D. Hale CARPENTER, M.B.E., D.M., F.R.E.S.

BUTTERFLIES of the genus *Euploea* (*sens. lat.*) in the area known by the convenient, if strictly unscientific, name of "Melanesia" have for some years been the subject of an intensive study in which I proposed to ascertain the limits of variation in the spotting, and the geographical range and variations of each species represented in that area, which may roughly be described as extending from the Bismarck Archipelago and eastern end of New Guinea south-eastwards to Fiji. The large collections at Oxford, Tring, and South Kensington have been fully utilised, and a collection of 150 specimens was sent me for study by the kindness of the American Museum of Natural History. I have also, during visits to Berlin and Munich in 1938, seen the collections in those places. Altogether, about 5500 *Euploea* from the area concerned have been closely examined.

A preliminary account (Carpenter 1940) was communicated to the Pacific Science Congress at San Francisco, 1939.

The outbreak of war put a stop to the work. But as a number of new forms, and certain mistakes needing correction, had been found it seemed better to deal with them at once and not to wait for the completion of the full paper. I am greatly indebted to the Keeper of Entomology, British Museum (Natural History), and to Dr. Karl Jordan, F.R.S., who was in charge at Tring when the work was done, for facilities for making the fullest use of the rich material in their charge: Dr. A. S. Corbet, Mr. A. G. Gabriel, Mr. F. Goodson, and Mr. G. Talbot have been kindly helpful.

The arrangement, and nomenclature, here used are according to Hulstaert in Wytman 1931, *Genera Insectorum* 193. I have found it best to describe the spots as comprising three series, running across the wing. The outermost, along the edge, I term *admarginal*; the innermost, in a row round the end of the cell, *discal*; and the intermediate row, *submarginal*. In addition there may be a spot within the apical half of the cell, but it is absent from many species. The *admarginals* are small and, typically, paired and may extend from area 1a to area 8 on the fore-wing, 1a to 7 on the hind-wing: sometimes they are absent from area 4 on the fore-wing although otherwise well represented (e.g. *helcita* forms). The *submarginals* on the fore-wing are often only represented near the apex on the upperside: these are by some authors described as apical or sub-apical.

It should be noted that, on the fore-wing, the line of spots when fully developed in areas anterior to 7 curves towards the base at a right angle as far as 10 or even 11 owing to the disposition of the areas along the costal margin. The *submarginal* series may extend from 1b to 8: the spots at the bases of 9, 10 and even 11 belong to the *discal* series. It is a character of some species that the spot is absent from area 3 (*cerberus*). On the hind-wing the *submarginals* are of two types. There is a single, rounded, spot in each of the areas 4, 5, 6 and sometimes 7, of which the first three may be the only *submarginals* showing on the upperside. From area 1b to 3 the *submarginals* are elongated, and paired, although often one of the pair only may be represented, when it is recognisable by its position to one side of the mid-line. The pair may be joined at their inner ends, or along their contiguous sides, to form a single

large blotch, notched proximally and distally. The discal series on the fore-wing may be represented above by only the spot in 10, usefully known as "costal 10," or may be entirely absent from both sides. They are often elongated, and, like those on the hind-wing, may show a blue or purple tint absent from the submarginals and admarginals. The discals of the hind-wing rarely show on the upperside: below they may extend from 1b to 8, more usually 1c to 7, the extremes in the series being much narrower in form. The spot may be absent from area 6 in even a highly spotted specimen.

Various degrees of fusion between members of a series, or of adjacent series, may occur and produce striking patterns.

In some cases I have shown the range of variation of spotting by citing maximal and minimal development for male or female: these are the results of detailed examination of very many specimens.

1. *Euploea* (*Vonona*) *climena* Stoll in Cramer 1782.

Fruhstorfer, in Seitz (: 227), places *mangoensis* Butler as a form of *climena* which is certainly not correct. It is the form of *boisdualii* Lucas 1853 occurring in the eastern isles of Fiji, far beyond the range of *climena*.

2. *Euploea* (*Vonona*) *bigamica* Strand 1914.

The male type, in the British Museum, from Bougainville Island, is quite certainly a form of *honesta* Butler 1882. It has the brand on the fore-wing unusually short and narrow, being in length only one-quarter of the length of vein 2, but this is matched by another specimen in the British Museum from Aola. The spotting is as follows—Upperside, fore-wing, discal series, a small oval in 3, narrow streak in 4, streak in 6. None on hind-wing. Underside, fore-wing, discal series, oval 2 and 3, streaks in 4, 5, 6: cell spot present. Hind-wing, discal series, streak in 1c, spots in 2-6: cell spot present.

Strand's female type of *bigamica*, also from Bougainville, is unique; I have seen nothing like it: the spots of the underside almost suggest that it is a hybrid between *honesta* and *asyllus* Godman & Salvin 1888, though this seems extremely unlikely. Upperside like other *honesta* females. Fore-wing, discals, a minute 3 and a small elongated 4: cell spot present. Hind-wing, no spots. Underside shows marked differences from *honesta*. Fore-wing, traces of admarginals in 3 and 4: submarginals, 2-8. Discals 2, 3, 4 are large, 6 small, and costal 10 present which is never the case in *honesta*. A large cell spot. Hind-wing, admarginals, a pair in each area from 3-6, increasing in size anteriorly. Submarginals, one of a pair in 2, pairs in 3-4, single spots in 5, 6, and 7, the last being minute. Discals, a linear 1c, spots 2-7. Cell spot present.

3. *Euploea* (*Vonona*) *honesta* f. *apicalis* form. n.

Type male in the Tring Museum (*A. S. Meek*), San Christoval, Solomon Isles, 19.iv.-9.v.1908.

Upperside, fore-wing. Spotless: a white apical patch extends from about the middle of area 10 to vein 3, being narrower and slightly suffused with brown in area 3. The white patch is separated from the margin by a narrow dark brown area, just leaving the base of area 7 white. Hind-wing also spotless: a broad marginal area decidedly paler than is usual in *honesta* extending inwards half the distance from the margin to the apex of the cell. Underside, fore-wing. The white area reaches the margin of the wing and extends back just across vein 2, narrowing posteriorly. There is the typical elongated white streak of *honesta* in 1b; discals 2, 3, 4 all small, and cell spot reduced to a minute point. Hind-wing. A narrow white border extends inwards two-fifths of the distance from margin to apex of cell. Discals 2, 3 very small, 4, 5, 6 larger. Cell spot small. A

second male specimen, a paratype, in the British Museum (N.H.) at South Kensington bears the label (certainly erroneous) "Australia—Leggatt. 1902—236". Someone has rightly been suspicious of this and appended another label " ? Ugi Is.", which is a very likely locality. The paratype very closely resembles the type, except that the white apical patch does not extend further back than vein 4. The pale marginal band on the hind-wing contains a pair of submarginal spots in 1c, repeated faintly in 2 and more faintly in 3. The underside resembles that of the type but on the fore-wing the cell spot and discals 2, 3, 4 are larger and conspicuous.

This white-tipped form is of interest because it seems to be an approach to the strongly white-marked species *branchleyi* Butler 1870 of the same localities (Carpenter 1940 : 308). There is quite a likeness to *woodfordi* Godman & Salvin 1888, which is probably derived from *honesta*, occurring on another of the Solomon Isles, Maleita; but the white margin of the hind-wing differs from that of *woodfordi* by being continued forwards to the costal angle of the wing, whereas in *woodfordi* it fades away at vein 4 or 5. Moreover, *woodfordi* does not have a white margin to the fore-wing beneath.

It is appropriate to mention here that two forms attributed to *honesta* by Hulstaert, namely *prusias* and *pronax* described as species by Godman and Salvin in 1888, should be attributed to *nechos* Mathew 1887. The relationship with *nechos* is obvious at sight: one can only conclude that Hulstaert never saw specimens.

4. *Euploea* (*Vonona*) *cerberus* Butler 1882.

Described from New Britain. Hulstaert in Wytman 1931, *Genera Insectorum* 193 : 115, says it is probably a race of *alecto* Butler 1866, but it seems to me a definite entity characteristic of the Bismarck Archipelago, though occurring, less abundantly, in New Guinea. As there is considerable resemblance between this species and *obscura* Pagenstecher 1894, it will be useful to state here differences noted in the examination of very many specimens.

Upperside. The spotting on *cerberus* is much more definite: the fore-wing is more strongly lobed on the inner margin, and the sex-patch on the hind-wing is neither so large nor so distinctly marked. On the hind-wing *cerberus* never has more submarginals than 4, 5, 6, while *obscura* often has. The outer part of the fore-wing of *cerberus* is paler than the rest: in *obscura* the coloration is more uniformly darker brown.

Underside. The admarginals of the hind-wing are well developed in *cerberus*, very poorly in *obscura*. Discal 2 always present on fore-wing of *cerberus*; absent from *obscura* (with extremely rare exceptions). Discal 5 almost always absent from fore-wing in *cerberus*, often present in *obscura*.

There is a form of *cerberus* on Mathias Island of which six males and a female are in Tring Museum, captured by F. Eichhorn, June–July, 1923. They show sufficient characteristics to be distinguishable, and I here describe them.

Euploea (*Vonona*) *cerberus* *griseitincta* subsp. n.

The six males, syntypes, show a distinct grey-brown tint towards the apex of the fore-wing: in spotting they do not differ from *c. cerberus*, varying between the extremes set out below.

Maximal. *Upperside*. Fore-wing. Submarginals 2–6. Hind-wing. Submarginals 5–6. *Underside*. Fore-wing. There is, in addition to the white inner margin, a white streak in 1b, more developed than is usual in *cerberus*. Submarginals 1b–8. Discals, streak in 1b, spots 2–6 but 5 very minute. Cell spot present. Hind-wing. Admarginals, one 3, pairs 4–5, one 6. Submarginals, 4–7. Discals, 1c–7. Cell spot present.

Minimal. *Upperside*. Fore-wing. Submarginals 3–6. Hind-wing. Submarginals

5-6. Underside. Fore-wing. Submarginals 2-6. Discals 2-4. Cell spot present. Hind-wing. Submarginals 4-6. Discals 2-6. Cell spot present.

A single female from the same locality is at Tring; it has the same coloration as the male. The spots on the under surface are relatively larger than in *c. cerberus*. Fore-wing. Submarginals 2-7. Discals 2-4. Cell spot present. Hind-wing. Admarginals, pairs 4, 5, single 6. Submarginals. In addition to the usual 4, 5, 6 and a minute 7, there is a single 2, and a pair in 3 which are not seen in *c. cerberus*. Discals 2-7. Cell spot present.

5. *Euploea hecitta lauensis* subsp. n.

For description by G. Talbot, see p. 139.

6. *Euploea (Crastia) eleutho* Godart 1824.

Fruhstorfer, in Seitz (9 : 241), placed *proserpina* Butler 1866 under *eleutho*. It is, of course, a characteristic Fijian form of *boisduvalii* Lucas 1853.

7. *Euploea (Crastia) illudens* Butler 1882.

The type male comes from New Ireland, the type female from Duke of York Island. Butler at the same time distinguished another male and female from Duke of York Island as *decipiens*. I have seen these types and compared them with very many specimens of *illudens* and find *decipiens* to be only weakly-spotted specimens of *illudens*. Since *decipiens* comes after *illudens* in the same paper by Butler it can be sunk as a synonym. Similarly, *lygdamis* Fruhstorfer (Seitz 9 : 243) from New Mecklenburg sinks as only a large, well-spotted, specimen of *illudens*.

		Admarginals	Submarginals	Discals	Cell spot
Type ♂ <i>illudens</i>	Above {	F.W. Nil	Minute 3, 4, 7, larger 5, 6	Nil	Nil
		H.W. Nil	Nil	Nil	Nil
		F.W. Nil	3-8	Diffuse 2, clearer 3, 4, minute 6	Present
	Below {	H.W. Pairs 4, 5, one 6	4, 5, 6	1c-7 (7 minute)	Present
Maximal ♂ <i>illudens</i>	Above {	F.W. Nil	3-7	Nil	Nil
		H.W. Nil	½ pair 2, pair 3, singles 4, 5, 6	Nil	Nil
		F.W. Nil	3-8	2, 3, 4, streak 5-6	Present
	Below {	H.W. Pairs 4, 5, 6	½ pair 2, pair 3, singles 4, 5, 6	1c-7 (extremes linear)	Present
Minimal ♂ <i>illudens</i>	Above {	F.W. Nil	Nil	Nil	Nil
		H.W. Nil	Nil	Nil	Nil
		F.W. Nil	4-7, minute 4 (minute), 5, 6	2, 3, 4	Small
	Below {	H.W. Nil	4 (minute), 5, 6	2, minute 3, 4, 6	Very small
Type ♂ <i>decipiens</i>	Above {	F.W. Nil	Nil	Nil	Nil
		H.W. Nil	Nil	Nil	Nil
		F.W. Nil	Small 3, 4, 6, 7 (5 absent)	Diffuse 2, very small 3, 4	Very small
	Below {	H.W. Nil	4, 5, 6	1c-6 all small, but 2 and 6 less small	The largest spot on H.W.
Type ♂ <i>lygdamis</i>	Above {	F.W. Nil	3, 4, trace 5, 6, 7	Nil	Nil
		H.W. Nil	5, 6	Nil	Nil
		F.W. Nil	3-7	2, 3, 4	Present
	Below {	H.W. Pairs 4, 5, one 6	4, 5, 6	1c-6	Present

Just as there is a distinct race of *cerberus* on St. Mathias Island, so also *illudens* varies in a similar manner, being notably greyer-brown than the nominotypical form, especially towards the apex of the fore-wing. This subspecies is here described as *mathiasana*.

***Euploea illudens mathiasana* subsp. n.**

There are seven males at South Kensington, and at Tring seven males and four females from which ♂ holotype is chosen, collected by Eichhorn, June-July 1923. The specimens are slightly smaller, greyer-brown, especially towards the apex of the fore-wing, and the spots on the whole more noticeable. On the underside there is little difference in colour from *i. illudens*.

		Admarginals	~Submarginals	Discals	Cell spot
♂ holotype <i>illudens</i> <i>mathiasana</i>	Above {	F.W. Nil	3-7 (4, 5 the smallest)	Nil	Nil
		H.W. Nil	Small 6	Nil	Nil
		F.W. Nil	3-8 (subequal)	2, 3, 4 (all small, 2 dyslegnic and slightly suffused brown)	Small
	Below {	H.W. On R., feebly developed pair 5, one 6 On L., single 6	Minute 3, larger 4, 5, 6	1c-6 (4, 5 minute)	Larger than in F.W.
♂ maximal spotting	Above {	F.W. Nil	3-8	Nil	Nil
		H.W. Nil	4-6, large and clear	Nil	Nil
		F.W. Nil	Minute 2, larger 3-8	2-4	Present
	Below {	H.W. Pair 4, 5, single 6	Single 2, pair 3, single 4, 5, 6 (6 largest on wing), minute 7	1c-6, trace 7	Present
♂ minimal spotting	Above {	F.W. Nil	3-7 (5 very minute)	Nil	Nil
		H.W. Nil	Trace of 6	Nil	Nil
		F.W. Nil	3-8	2-4	Present
	Below {	H.W. Trace of single 5	4, 5, 6	2-6	Present
♀ maximal spotting	Above {	F.W. Nil	Trace 1b, 2-8	1b, 2, 3, 4, 6 (2 and 6 very faint)	Present
		H.W. Nil	4, 5, 6	2, 3, and 6	Present
		F.W. Nil	1b-8	Streak 1b, spots 2, 3, 4, 6	Present
	Below {	H.W. Pairs 4, 5, single 6	3-7	1c-7	Present
♀ minimal spotting	Above {	F.W. Nil	2-6	Nil	Nil
		H.W. Nil	4 (very faint), 5, 6	Nil	Nil
		F.W. Nil	1b (trace), 2-6, 8	Nil	Present
	Below {	H.W. On R., pair 4, single 5 On L., pair 4 (all faint)	4-6	2, 3, 6, 7	Present

8. *Euploea* (*Crastia*) *boisduvalii* subsp. *fraudulenta* Butler 1882.

Fruhstorfer (1910 : 244) described as *lystra* a specimen of Lucas' species from Treasury Isle, captured by C. Ribbe. The type is in the British Museum (Natural History), but

after inspection I am convinced that it does not differ sufficiently from many other females of *boisduvalii fraudulentula* to be given a separate name, and *lystra* should be sunk.

Fruhstorfer (1913 : 134) described as *rendovana* a specimen from Rendova Isle which has an accessory sexual brand on the fore-wing in area 1b, posterior to, and smaller than, the normal. I have seen this, and it is merely an individual aberration : there is a second specimen, from the same locality, in the British Museum in which the accessory brand is still smaller : four other specimens from Rendova do not differ from normal *fraudulentula*. The name *rendovana* should be sunk.

9. *Euploea* (*Crastia*) *boisduvalii* f. *albomarginata* form. n.

The small race of *boisduvalii* on the Santa Cruz Isles, known as *era* de Nicéville 1902 (? = *torvina* Butler 1875) has a most interesting representative in the Solomons on San Christoval which has developed a white border, thus harmonising with the prevailing tendency in that area (Carpenter 1940 : 308) well shown by the local species *brenchleyi* Butler 1870 and *imitata* Butler 1870. The type specimen, in the British Museum (N.H.), is a female collected by A. S. Meek between 19.iv. and 9.v.1908.

The characteristic white border is a development of a tendency shown in *boisduvalii bakeri* Poulton 1927, of Banks Isles and New Hebrides, as a whitey-brown submarginal area. In *albomarginata* this paler area on the upperside is pure white on the fore-wing with a narrow brown margin of one or two millimetres breadth. On the hind-wing the white area is not so pure white as on the fore-wing but is whiter than in *bakeri*. The white area on the under surface extends to the margins of the wings, but is very slightly suffused with brown at the apex of the fore-wing : on the hind-wing it is more sharply defined proximally than on the upper surface. The spots shown are as follows, on the under surface. Fore-wing. Discals. A streak in 1b and spots of very small size in 2, 3 and the cell. Hind-wing. Discals 3-6 and cell spot. A second female, a paratype, taken on Santa Anna Is. by Woodford agrees with the type.

Male allotype. Through the kindness of Mr. F. E. Watson I have been able to see a male of *albomarginata* from Bauro Is. (= San Christoval), taken on 14.iv.1927, which is in the collection of the American Museum of Natural History. In coloration it resembles the holotype. The spotting, on the under surface, is as follows : Fore-wing, discals 2-3 and cell spot. The spot in 2 is a little more elongated than in the female ; the spots in 3 and in the cell are very small. Hind-wing. Discals 2-6, and cell spot, all small.

The error made by Fruhstorfer (1910 : 241) in placing *proserpina* under *eleutho* has already been noted.

10. *Euploea* (*Stictoploea*) *sylvester* Fab. 1793, *magnipunctata* subsp. n.

A large form from the Banks Islands characterised by the strong development of the white spots : on the hind-wing these are considerably elongated antero-posteriorly in areas 1c, 2, and 3. Male holotype. Upperside. Fore-wings intensely blackish-brown with purple suffusion faintly discernible over the distal half. Hind-wings dark brown, without purple suffusion, and slightly paler along the costal border. Spots as follows : Fore-wing. Admarginals faintly showing through from underside ; a few scales make up a bluish point on the left wing just in front of vein 2. Submarginals, 2-7, white, tinted proximally with purple : 2, 3, 5, 7 subequal, 4 minute, 6 the largest and notched externally : 4 and 5 are situated slightly more peripherally. Discals. A small spot at base of 6, a few scales at base of 9, a slightly larger number of scales at base of 10 making a minute costal spot. Brands in 1b well developed : the anterior measuring 14 by 2 mm., the posterior 18½ by 2 mm. Hind-wings. Submarginals greatly developed, forming a striking feature. A pair in 1c, 2, 3, much elongated proximally. The largest, the anterior one in 3, measures 4 mm. in length and 1½ mm. in breadth : the smallest, and most posterior, 2 by 1 mm. A large spot,

notched distally, in 4, 5, 6. Discals, a small 7. Underside. Less difference in colour between fore- and hind-wings, both blackish-brown and darker from base to outer margins of discals. Area 1a of fore-wing dull white over basal three-quarters: on hind-wing a dull white suffusion forms a narrow band along basal half of costal margin of area 8. Spots as follows. Fore-wing. Admarginals. The anterior member of a pair in 1b, pairs 2, 3, and a few minute irregularly distributed spots in 4, 5, 6. Submarginals, as on upperside but slightly larger, with an additional spot in 8. These, like the admarginals, pure white. Discals; a bluish-white basal spot in 2-6 and 9, 10. A triangular bluish-white cell spot. Hind-wing. White admarginals as follows. The anterior member of a pair in 1b, a pair in 1c-5, and the posterior member of a pair in 6. Submarginals, white; a trace in 1b, much elongated pairs in 1c-3, and single spots, notched peripherally, in 4, 5, 6: the most elongated is the anterior member of the pair in 3, measuring 5 mm. Discals. Trace 1b, elongated dull white pair 1c, single bluish-white spot 2-7. Cell spot bluish-white. In addition, small spots at roots of wings as follows: Fore-wing, a linear mark 1 mm. long posterior to root of median vein. Hind-wing, a spot in 1a, 1c, and 8.

The female allotype is also described as it differs somewhat from the male. Dark brown without purple suffusion; hind-wing paler distal to spots. Fore-wing spots on upperside more conspicuous than in male, and so faintly purple-tinted that they seem to be a purer white than those on the hind-wing which look dull white by comparison. Spots as follows: Fore-wing. Submarginals larger than in *s. tristis*; a few scales only in 1b; 2, 3 and 6 subequal; 4 and 5 much smaller and situated more peripherally; 7 little larger than 5; 8 minute. A few scales mark the cell spot which also shows through from below. Hind-wings. Submarginals, paired in 1c, 2, 3, single in 4, 5, 6: not so elongated as in male the longest (in 2) measuring 3½ mm. The discals show through from below.

Underside: coloration much as above. Inner margin of fore-wing dull white over most of 1a. Discals and cell spots on both wings faintly bluish-white, others white. Spots as follows: Fore-wing. Admarginals. The anterior member of a pair in 1b, pairs 2, 3, posterior member of a pair in 4 on right wing only. Submarginals, 1b-8. The two extremes about the same small size, 2, 3, 6 larger, 4 and 5 intermediate and more peripheral, 7 about the same size. Discals. An elongated streak in basal half 1b, spots in 2-6, 9, 10. Cell spot present. Hind-wing. Admarginals. The anterior member of a pair in 1b, pairs 1c-5. Submarginals. A faint one in 1b, elongated pairs 1c-3, the longest (in 3) measuring 4 mm.; single spots 4, 5, 6. Discals. A pair of linear markings in 1c, single spots 2-7, 7 largest. Cell spot of irregular shape. In addition, basal spots in 1a, 1c, and 8, and on root of subcostal vein.

Holotype male. BANKS ISLANDS: Ureparapara, forest about 20 feet above sea-level, *J. R. Baker*, 30.ix.1922. Oxford University Museum.

Allotype female. BANKS ISLANDS: Pakea, *H. W. Simmonds*, 27.xi.1923, Oxford University Museum. Paratypes, in Oxford Museum. Males. Two, Ureparapara, *J. R. Baker*, 30.ix.1922. Two, Pakea, *H. W. Simmonds*, 27.xi.1923. Females. Three, Pakea, *H. W. Simmonds*, 27.xi.1923.

Among these paratypes one male has the spots even larger than in the holotype, except for the anterior discals on the upperside of the fore-wing, which are only just visible: on the hind-wing the anterior submarginal in 3 is nearer 5 than 4 mm. long. In other paratypes the enlargement is less than in the holotype although always greater than in *s. tristis*. Among the female paratypes one has the anterior discals on upperside of fore-wing slightly larger than in allotype, and the pair of submarginals in 2 on the hind-wing are joined proximally. This is interesting because this new subspecies, *magnipunctata*, is obviously transitional from *s. tristis* to *s. pelor* Doubleday 1847, of North Australia, in which the enlargement is carried further, although the paired spots still retain their identity. In *s. sylvester* Fabricius 1793 they are completely merged into one, except for a notch at the distal end.

The new subspecies also differs from *pelor* by showing less difference in size between members of the submarginal series on upperside of fore-wing. In *pelor* 4 and 5 are disproportionately small, and in *sylvester* they have almost, and in some specimens quite, disappeared.

A female of *pelor* from Darwin is more like those from Pakea than are the respective males, but the spots in fore-wing areas 2-3 above are more elongated in *pelor*; the contrast between the spots in 4-5 and the others is less marked than in the males. The admarginals on the underside are much better developed in *pelor* than in *magnipunctata*, in which, also, they are more developed than in *s. tristis*.

The female *magnipunctata* has a white streak on the under surface of area 1b of the fore-wing, anterior to the white border, as in *s. tristis*, but in *pelor* this is represented by its outer extremity only, as a bluish-white dot of the discal series. In this respect the only female *sylvester* at Oxford has developed further than *pelor*, for the streak is quite absent.

It seems that *magnipunctata* is a step in the development of *sylvester* through *pelor*, and it is interesting that this form has not been found on the more southern isles of the New Hebrides group. A male and female *s. tristis* at Oxford, from Aoba Is., east of Espirito Santo, show decided transition between *tristis* and *magnipunctata*: the spots on the hind-wing are slightly larger than in *tristis*. The largest of the submarginals, in area 3, measures 3 mm. in length in male and female. In the series of 38 *s. tristis* at Oxford these paired spots in 1c-3 are scarcely, if at all, elongated, the maximal length on the upperside being 2 mm., the spot being so little elongated that it is almost circular. A specimen at Oxford from Fergusson Island, off the south-east end of New Guinea, captured by Meek, is interestingly transitional to *doleschalii* Felder 1859. It has, on the fore-wing, only minute submarginals in 2-3, but they are well developed in 6-7: on the hind-wing the submarginals in 1c, 2, 3 are considerably elongated, the longest measuring $3\frac{1}{2}$ by 2 mm. The posterior border of the hind-wing shows the paler brown characteristic of *doleschalii*: the spotting of the underside, with the exception of the remarkably developed submarginals of the hind-wing, agrees with that of *doleschalii* rather than of *tristis*.

There is little doubt that many species and forms besides those mentioned here could be sunk under the one species *melina* Godart 1819.

11. *Euploea* (*Calliploea*) *tulliolus* F. 1793 *goodenoughi* subsp. n.

I am greatly indebted to Dr. Karl Jordan, F.R.S., for letting me see the unique specimen, in the Tring Museum, now described as a new subspecies. Dr. Jordan showed it to me for comparison with *E. jennessi*, recently described (Carpenter 1941), but close study identified it as a member of a different group. The specimen, captured on Goodenough Island (*A. S. Meek*) at 2500-4000 feet elevation, March-May 1913, is a female in good condition and is the sole representative of the *tulliolus* complex yet known from Goodenough. Mr. G. Talbot, who kindly compared the specimen with other *tulliolus* forms in the British Museum (N.H.), is of the opinion that it is nearer to *darchia* McLeay 1827 from Australia than to any other named form of *tulliolus*; but in my opinion it differs in several important characters. It has considerable resemblance to its nearer geographical relations on the eastern part of New Guinea. The description of this holotype female is as follows: General ground-colour of upperside brown, as in *darchia*, without any purple gloss. On the fore-wing, along vein 2 and contiguous to the posterior border of the white spot in area 2, there is dull yellow suffusion, and on the hind-wing there is a faint dull yellow tint in area 6 and in areas 2, 3, 4, where the submarginals show faintly. Spots as follows: Upper surface. Fore-wing. Submarginals large and conspicuous as in *darchia*, white. 1b and 3 comparatively small, 2 large, 4-8 rather elongated and narrow, 6 being longest: there is a trace only of 9. There is a strong difference from *darchia* in that costal 10 is not represented, whereas it is a feature of all Australian forms. It is also absent from the New Guinea

forms *doryca* Butler 1878, and *dudgeonis* Grose-Smith 1894. Hind-wing. Very faint, yellowish, traces of paired submarginals 2, 3 and single 4, 5. A small spot in 6 is white. The hind-wing provides a very decided difference from *darchia* in which the submarginals form a conspicuous white band, but it is noteworthy that traces can just be seen in *good-enoughi*. Under surface. Fore-wing. Some unusual features here. Area 1a is dull brownish-white; in 1b a dull white patch occupies the middle third and a similar patch occupies the middle third of 2, joining the submarginal. These two patches owe their dull white tint to a faint trace of purple colour. There is a narrow discal 3, flattened antero-posteriorly. I have not seen a discal 3 in any other specimen of the *tulliolus* complex. Costal 10 is absent. Hind-wing. The only spot is a very small submarginal 6; the traces on the upperside are not visible below. The complete absence of all admarginals constitutes a striking difference between *goodenoughi* and *darchia*: *doryca* has them in fair number: the only specimen of *dudgeonis* at Oxford has none.

12. *Euploea* (*Calliploea*) *pumila* Butler 1866 *manusi* subsp. n.

A series of nine males from the Admiralty Isles, Manus, seems sufficiently distinct to be described as a subspecies. They are in the Tring Museum. The general coloration is a darker purplish-brown than that of *p. bismarckiana* Ribbe 1898, and the hind-wing is more strongly spotted. The new subspecies approaches *p. jamesi* Butler 1876 in the larger size of submarginal 6 on upperside of fore-wing, being intermediate between *jamesi* and *bismarckiana*, and has larger anterior submarginals on hind-wing below. Type and eight paratypes collected by Meek, Sept.-Oct. 1913.

		Admarginals	Submarginals	Discals	Cell spot
Type	Above { F.W. H.W. F.W.	Nil Nil On R., single 2, pairs 3-6, one 7	2-7 blue to bluish- white, 6 largest 4-6 white 4-7, 6 largest	Nil Nil 10	Nil " " Nil Nil
	Below { F.W. H.W.	On L., single 3, pairs 4-6, one 7 Pairs 1c-4, single 5	4-7, white, larger anteriorly	Nil	Nil
Maximal spotting	Above { F.W. H.W. F.W.	Nil Nil Single 2, pairs 3-6, single 7. All small	2-7, 6 much largest Pair 3, singles 4-6 2-5 very small, 6 larger, 7 small	Nil Nil 10	Nil Nil Nil
	Below { H.W.	Pairs 1c-6	Faint 2, pair 3, 4-7, conspicuously white and larger anteriorly	Nil	Nil
Minimal spotting	Above { F.W. H.W. F.W.	Nil Nil Pair 3-4 minute	4-7 4-5 3-7, all minute ex- cept 6	Nil Nil 10	Nil Nil Nil
	Below { H.W.	1c-5 weak and irregular	4-7	Nil	Nil

13. *Euploea* (*Salpinx*) *nemertes* Hübner 1806 *pulchella* subsp. n.

A series of specimens in the British Museum, taken by Eichhorn in June-July, 1923, on Mathias Isle in the Bismarck Archipelago is distinct enough to be separated as a geographical race. There are six males at South Kensington, and nine males and four females at Tring. The race is of small size, even smaller than *n. perdita* Butler 1882 and is charac-

terised by its lighter brown colour, becoming quite a golden brown distal to the cell of the fore-wing. The discal spot in 1b of fore-wing is small. The yellow sex-patch on the hind-wing covers the bases of areas 5, 6, and part of 7, and extends into cell as far as its longitudinal diameter. External to this yellow area the wing is silver grey to just beyond spot 6, and almost to posterior border of cell.

		Admarginals	Submarginals	Discals	Cell spot
♂ type	Above { F.W. Nil H.W. Nil F.W. Nil H.W. One in 3, 4 (minute)		2-7, trace 8 6 2-8 Pair 2-3, singles 4-7, increasing anteriorly, slightly blue	Nil Nil 2, 10 Nil	Nil Nil Nil Nil
♂ maximal	Above { F.W. Nil H.W. Nil F.W. Single 1b, pairs 2-6, single 7 Below { H.W. Pairs 3-4, single 5		Large 2-6, small 7, 8 4, 5 (minute), 6 2-8 Minute 1c, pairs 2-3, singles 4-7, increasing anteriorly	Nil Nil 2, 10 Nil	Nil Nil Nil Nil
♂ minimal	Above { F.W. Nil H.W. Nil Below { F.W. Nil H.W. Nil		2, 3, 6 4-6 (very small) 2-8 Pairs 2-3, singles 4-7	Nil Nil 2 (trace) Nil	Nil Nil Nil Nil
♀ maximal	Above { F.W. Nil H.W. Nil F.W. Nil Below { H.W. Singles 2-3, pair 4		2-8 4-6 2-8 Single 1c, pairs 2-3, singles 4-7	10 (faint) Nil 2, 10 Nil	Nil Nil Nil Nil
♀ minimal	Above { F.W. Nil H.W. Nil Below { F.W. Nil H.W. Nil		2, 3, 6 4-6 (very small) 2-8 Pairs 2-3, singles 4-7	Nil Nil 2 (trace) Nil	Nil Nil Nil Nil

The adjacent Squally Isle has somewhat similar specimens (males four and females three, at Tring), intermediate between *n. perdita* and *n. pulchella*.

14. *Euploea (Salpinx) nemertes graeffiana* Herrich-Schaeffer (1869).

The name "*graeffiana* H.-S." commonly applied to the race of *nemertes* characteristic of the New Hebrides group of islands must be given up, as it is a synonym of *macleayi* C. & R. Felder 1865. The matter is complicated, and I am indebted to Dr. B. M. Hobby for assistance in solving questions of nomenclature.

1. C. and R. Felder (1865—see references at end) described as *macleayi* a form of *nemertes* from "Ins. Fidchi" which is characteristic of those islands.

2. Graeffe (1868) gave an account of a journey in Viti-Levu, Fiji, and certain insects then collected are described, figured, and named. The last of these is named "*Euploea Graeffiana* Hr." The figure illustrating the notes agrees with the ordinary Fijian specimens, named *macleayi* by C. and R. Felder in 1865. There appears to be a small error in the plate, for a spot is figured on the inner margin of the fore-wing in area 1a. I have examined many hundreds of *nemertes*, of various forms, and have never seen a spot in this position: it appears to be that of area 6 of the hind-wing transferred to the fore-wing. The name *graeffiana* cannot stand. The author of the description of this butterfly (in a paper on

Fiji) has apparently confused its locality with that of other insects, from Samoa, described in the same paper, for he alludes to it in his note on the plate as "Die von Herrn Dr. Graeffe auf Samoa entdeckte Art." No butterfly of this type is known from Samoa, however.

3. Dohrn (1868) discussed Graeffe's paper and concluded (p. 202) that the description, and name *graeffiana*, were both by Heer, although it is not so stated in the text. Dohrn, reasonably, considered that the abbreviation "Hr." referred to Heer.

4. Herrich-Schaeffer (1869A) rather guardedly adopted Dohrn's view that Heer was the author of the name *graeffiana*, but used the name Heer in brackets with a ?. He figured (on Plate 2, fig. 5, not, as he stated, on Plate 1, fig. 1) the underside of a specimen stated to come from "Vanua Valava." This introduces a new complication: the author in his first paragraph indicated that he is referring to a collection made by Graeffe "von den Viti-, Tonga- und Schiffer Inseln" (i.e. Fiji, Tonga, and Samoa), but says the specimen came from "Vanua Valava." This name is not used at the present day but can be found in other German writings (e.g., Fruhstorfer, 1900, *Berlin ent. Z.* 45 : 7) as a locality for *tulliohus seriata* Herrich-Schaeffer 1869. The name refers to Vanua Lava in the Banks group. It is possible that Herrich-Schaeffer was confused between "Vanua Valava" and Vanua Mbalavu, the latter locality being in the Fiji Isles. Vanua Mbalavu can easily become Vanua Balavu, which is readily confused with "Vanua Valava." Since the butterfly figured by Herrich-Schaeffer is of the usual Fiji type, and is not known on either Tonga or Samoa, it may be presumed that the confusion lies in the similar geographical names.

Herrich-Schaeffer's specimens were formerly in the Godeffroy collection at Hamburg, but an enquiry in 1930 elicited the reply from Professor Dr. E. Titschack that the Hamburg Museum contained no Fijian specimens of *nemertes*. However, a clue was provided by Van Eecke (1916 : 257) who, discussing collections in the Leiden Museum, alluded to a male and female of *graeffiana* acquired ex coll. Godeffroy in 1886. Through the kindness of Dr. Boschma of that museum I was enabled to see these specimens in 1938: they bear MS. labels with name *graeffiana* and as they also correspond with the description by Heer they are quite possibly the original types named by him. They are labelled "Samoa", which is certainly an error, but accounts for Heer's words quoted in (2) above.

5. Herrich-Schaeffer (1869B) gave a coloured reproduction of his former plate but definitely assigned the name *graeffiana* to Heer, repeating the name of the locality as Vanua Valava.

6. Butler (1874 : 276) referred to Herrich-Schaeffer's account and quoted the locality but introduced a new complication by referring to the insect as *graeffiana* Herrich-Schaeffer, ignoring Heer.

7. Butler (1876 : 251), in an account of a collection from New Hebrides, identified (wrongly) specimens as *graeffiana* (i.e. *macleanyi*) but alluded to them in a way which shows that he had another form, the one now known to be characteristic of that locality and not then known to science. He mentioned as a character (by which it can be distinguished from the closely allied *iphianassa* Butler 1866) "the pale external area of the wings." This character also distinguishes it from *graeffiana* Heer.

8. Butler (1878 : 293) discussed a specimen from "Vaté, New Hebrides" which he said is readily recognised by "the pale borders to its wings."

9. Butler's mistaken confusion of the markedly pale bordered New Hebrides race with the Fijian race in which the borders are less pale led to the name "*graeffiana* H.-S." (recte Heer) being universally adopted for the former, whereas it belongs to the latter and sinks as a synonym of *macleanyi* C. & R. Felder 1865. The New Hebrides race therefore requires a name, and I now describe it as *novarum-ebudum*, selecting the two males discussed by Butler 1876 as holotype and paratype.

Euploea nemertes Hübner 1806 **novarum-ebudum** subsp. n.

Differs from *n. macleayi* C. & R. Felder 1867 by smaller size and very decided pale borders to the wings, the proximal edge of the pale border being proximal to the row of submarginal spots: the pale border is more clearly defined on the fore-wing. The ground-colour is decidedly lighter than in *macleayi*. Coloration on the under surface as on the upper; but on the fore-wing area 1a, the posterior half of 1b, and anterior half of 1b as far outwards as the sex-patch are dull white. The oval patch on fore-wing in area 1b measures 3 by 1 mm. and is the only spot on the wing to show a faint violet tint. The yellow sex-patch on the hind-wing only occupies the outer half of the cell, the posterior half of the cell being grey-black, which also extends over bases of areas 4, 5, 6. Spots as follows, white. Upper surface. Fore-wing. Submarginals 2-5 of equal size, 6-8 larger and of about equal size. Discals. Costal 10 clearly defined, round. Hind-wing. Submarginals. 2-3 faintly showing through from below; 4-6, small. Under surface. Fore-wing. Spots as on upper surface but slightly larger. Hind-wing. Submarginals. Pairs 1c-3, white. Single spots 4-7, slightly tinted with violet in increasing amount towards costal margin.

Male holotype and paratype from New HEBRIDES: Havannah Harbour, Vaté (A. Corrie) in British Museum, No. 75-93. Paratype only differs from type by absence of submarginals from area 1c on underside of hind-wing. These are the specimens mentioned by Butler in 1876 as being new to the British Museum.

		Admarginals	Submarginals	Discals	Cell spot
♂ maximal	Above {	F.W. Nil	Small 2; 3-5, 6-8 larger	6, 9, 10	Nil
		H.W. Nil	2-3 (faint), 4-6	Nil	Nil
		F.W. Nil	2-8 subequal	2, traces 6, 9, 10	Nil
	Below {	H.W. Minute pair 3, single 4 (exceptional)	Pairs 1c-3, singles 4-7	Nil	Nil
♂ minimal	Above {	F.W. Nil	4, 5, 8 minute, 6, 7 the only conspicuous ones	Nil	Nil
		H.W. Nil	Nil	Nil	Nil
		F.W. Nil	Small 4, 5, larger 6-8	2, 10	Nil
	Below {	H.W. Nil	Pairs 2, 3, singles 4-7	Nil	Nil
♀ maximal	Above {	F.W. Nil	2-8 large (6-7 confluent)	9, 10	Nil
		H.W. Nil	Large 1c, pair 2 (joined at base), pair 3, singles 4-6	Nil	Nil
		F.W. Nil	2-8 large (6-7 confluent)	2, 10	Nil
	Below {	H.W. Nil	1b, 1c, pair 2 (joined at base), pair 3, singles 4-7	Nil	Nil
♀ minimal	Above {	F.W. Nil	2-7 (indistinct)	10	Nil
		H.W. Nil	Pairs 2-3, singles 4-6	Nil	Nil
		F.W. Nil	2-7	Minute 2, 10	Nil
	Below {	H.W. Nil	Pairs 2-3, singles 4-6	Nil	Nil

SUMMARY.

1. The following new subspecies or forms are described. *Euploea honesta apicalis*, *cerberus griseitincta*, *helcita lauensis*, *illudens mathiasana*, *boisduvalii albomarginata*, *sylvester magnipunctata*, *tulliolus goodenoughi*, *pumila manusi*, *nemertes pulchella*, *nemertes novarum-ebudum*.

2. The following errors are corrected. Fruhstorfer wrongly put *mangoensis* Butler under *climena*: it is a form of *boisduvalii*: he put *proserpina* Butler under *eleutho* instead of under *boisduvalii*. Hulstaert placed *prusias* Godman & Salvin and *pronax* Godman & Salvin under *honesta* instead of under *nechos*.

3. The following names are sunk as synonyms. Fruhstorfer's *bigamica* male = *honesta*; *decipiens* Butler = *illudens*; *lygdamis* Fruhstorfer = *illudens*; *lystra* Fruhstorfer and *rendovana* Fruhstorfer = *boisduvalii fraudulenta*; *graeffiana* Herrich-Schaeffer = *nemertes macleari*.

APPENDIX

By G. TALBOT, F.R.E.S.

Euploea helcita lauensis subsp. n.

♂♀. Connects *eschscholtzi* C. & R. Felder, from the western Fiji Is., with *distincta* Butler from the Ellise Is., and is nearer the former. Fore-wing with discal spot in area 3 more or less dusted with black as in f. *indistincta* Moore in which, however, the spot is smaller; spot in area 2 rarely darkened; subapical spots sometimes dusky. Hind-wing post-discal spots mostly larger than in either of the two allied forms, and antemarginal spots equally as strongly marked.

This form somewhat resembles *indistincta* but the latter has discal spot on fore-wing smaller, and antemarginal spots reduced to minute dots.

Habitat.—LAU ISLANDS, eastern Fiji group, Vanua Balavu and Mania. Vanua Balavu, April, 1931 (*R. J. A. Lever*), ♂ type. Lomaloma, south-east of Vanua Balavu, 1.ii.1922 (*H. S. Evans*), ♀ allotype (with discal spot less darkened).

A series of males and 1 ♀ in Hope Dept.

Specimens of the larger-spotted race *walkeri* Druce occur rarely in the Lau Is.

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BOOK NOTICE.

College Entomology. By E. O. ESSIG. pp. vii + 900, 308 figs. 8vo. New York (Macmillan), 1942. Price \$5.

This book is said by the author to contain the "... essential facts about insects with which every well-informed person should be familiar." "It is obvious that among the half million described species of insects many omissions are to be expected, but whatever species are here included have been selected for one of three reasons : (1) long associations with the human race ; (2) some peculiarity in form, size, color, habits ; or (3) [are] interesting and typical examples of a family."

The book contains 36 chapters, of which the first three deal with Metamorphosis, Anatomy and Classification, and the remainder each with an Order from the Protura to the Siphonaptera. An index of authors in three columns occupies 5 pages and an index of subjects also in three columns extends to no less than 63 pages.

The end papers of the book carry a coloured map of the zoogeographical regions of the world. Protest is again registered against this practice of utilising end papers for matters of permanent interest. It is difficult to see how the binder can preserve the pages adequately when rebinding the book.

Each of the chapters devoted to an Order of insects opens with the derivation of the name and usually an indication of the insects contained in the order and the French and German name. A short description follows, to which is added a general description with an indication of the habits and number of described species. A key to families is given and then each family is dealt with individually, and the leading types are illustrated. At the conclusion of each chapter a list of selected references is given, and at the end of the book a short list of General References.

A large number of misprints have been noticed in the book, especially in the references and particularly in the German titles. Other misprints to which attention may be called are the date of the establishment of the Order Blattaria Burmeister wrongly credited to the year 1929, and the misspelling Neuoptera on p. 148. In the list of references to the literature on Termites it is difficult to understand the inclusion of Hagen's *Bibliotheca Entomologica* with a full collation ; would the list of General References not have been a more appropriate place ?

The book is very well printed and the many illustrations are for the most part original.

CAMAROTA CURVIPENNIS LATREILLE (DIPT., CHLOROPIDAE), AND ITS MISQUOTATION

By R. L. COE.

(British Museum, Natural History.)

Camarota curvipennis, originally described as *Oscinis curvipennis* by Latreille (1805), has been misquoted by several authors as *C. curvinervis*. Hendel (1910) appears to have committed the original error. Collin (1911) gives the correct name. Duda (1933 : 114) follows Hendel's rendering of the name, besides misquoting the date of Latreille's description of the species as 1804, an earlier error of Becker to which Collin (1911) draws attention. Duda (1933 : 115) considers Zetterstedt's (1848) *Oscinis curvinervis* (*curvinervi*) to be a redescription of Latreille's "*curvinervis*" (i.e. *curvipennis*), but elsewhere (p. 120) in the same work he correctly ascribes *O. curvinervis* (*curvinervi*) to Zetterstedt and places it as a synonym of *Meromyza saltatrix* Linnaeus var. *nigriventris* Macquart; while it is quite likely that this synonymy is correct, it is quite certain from Zetterstedt's description of *curvinervi* that *curvipennis* Latreille represents a different species. Séguy (1934) wrongly quotes Latreille's species as *curvinervis*, and incidentally sinks *Camarota* Meigen as a synonym of *Oscinis* Latreille, a wrong procedure based on an error of Becker as shown by Collin (1911).

In the British Museum the name *Camarota curvinervis* has been applied erroneously to Latreille's *C. (O.) curvipennis* through the use of Duda's (1933) CHLOROPIDAE keys. As a consequence, a specimen of *C. curvipennis* submitted by Goodliffe was identified as *curvinervis*, and this incorrect rendering of the specific name appeared in his 1942 paper. The writer's thanks are due to Miss R. M. Davenport, of the Imperial Institute of Entomology, who drew his attention to this unfortunate discrepancy in the literature.

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A NORTHERN RECORD OF *ANOPHELES GAMBIAE* GILES (DIPT., CULICIDAE)

By D. J. LEWIS, M.A., F.R.E.S.

(Entomologist, Sudan Medical Service.)

As far as the writer is aware, *Anopheles gambiae* has hitherto been recorded neither from Egypt nor from any part of the Ethiopian Region farther north than Zeidab (17° 26' N., 33° 54' E.). In May 1941 two males and four females, obtained near Wadi Halfa, were received for determination from Dr. R. T. Campbell. They had been bred from larvae collected in river pools about

eight miles north of the town between the villages of Ashkeit and Dubeirá. This point is a few miles south of the Egyptian frontier, and presumably the species could exist north of the frontier if small temporary pools should occur.

De Meillon (1942, *Publ. S. Afr. Inst. med. Res.* 23 : 213), discussing the distribution of *A. gambiae* near its southern limit, in the Transvaal, states that as far as is known the species is present only in summer in the area with a range of temperature between 41° F. (22·8° C.) and 45° F. (25·0° C.) and with 0 to 50 days of frost a year. Wadi Halfa has from 0 to 2 days of frost a year and a temperature range of 33·6° C. (60·5° F.), the difference between the mean maximum for June and the mean minimum for January (1902 to 1934).

BOOK NOTICE.

The Plant Bugs, or MIRIDAE, of Illinois. By Harry H. KNIGHT. *Bull. Illinois nat. Hist. Surv.* 22 : 1-234, illust. 1941.

This monograph of the largest family of the Hemiptera deals with 440 species of the family either so far recorded from Illinois or, in the view of the author, likely to be present in the State.

In North America about 1500 species of MIRIDAE have been recorded against some 2500 species of all remaining families of Hemiptera.

This monograph is written mainly on the material especially collected by the author and other entomologists over a period of 10 years during which about 20,000 specimens were obtained. Due attention was paid to field work on the bugs and the results of this are incorporated in the work.

Keys to the subfamilies, genera and species are supplied throughout the book and many illustrations are given which should make easy the identification of any species that comes within its scope.

BOOK NOTICE.

Dictionary of scientific terms as used in the various sciences. By C. M. BEADNELL. 2nd edition. pp. x + 232 + 13. sm. 8vo. London (Watts & Co.). (Thinker's Library 65.) (1942.) Price 2s.

This work was first published in 1938 and a notice is given in 1938, *Proc. R. ent. Soc. Lond.* (A) 13 : 99. A new edition has become necessary and advantage has been taken to add a Supplement of 13 pages. The terms included in the Supplement are primarily of interest to physicists or to those who require a definition of terms used in Physics.

The main Dictionary is stated to explain over 6000 scientific terms and it is intended for the use "of students and that ever-increasing intelligent section of the public who are interested in the discoveries consequent on the rapid march of science. . . ."

ON THE GENUS *CRINORRHINUS* MARSHALL (COL., CURC.)

By Sir Guy A. K. MARSHALL, K.C.M.G., D.Sc., F.R.S., F.Z.S.

WHEN the genus *Crinorrhinus* was first proposed (1941, *Ann. Mag. nat. Hist.* (11) 8 : 373), it comprised only four described species; six additional new species are now recorded, the types of which are in the British Museum (Natural History).

As at present known, the genus is best represented in central and southern India (9 species); only two species have so far been recorded from Burma, and of one of these (*strabo* Marshall) a single specimen has been seen from Siam.

Key to the species of *Crinorrhinus*.

- 1 (2). Forehead much narrower than an eye (half to two-thirds); femora with a small spine-like tooth without any carina distally
strabo Marshall 1941.
- 2 (1). Forehead only very slightly narrower to slightly wider than an eye; femora with a triangular tooth continuing distally as a carina.
- 3 (4). Elytra with the alternate intervals costate, the basal margin between intervals 3 and 5 obtusely elevated; forehead with a very large median fovea; funicle with joint 2 much longer than 1 *foveifrons* Faust.
- 4 (3). Elytra with the intervals of equal height, the basal margin not raised.
- 5 (8). Forehead with a deep round median fovea (sometimes almost concealed by scaling or powder) on a line with hind margin of eyes; funicle with joint 2 slightly longer than 1.
- 6 (7). Forehead slightly narrower than an eye, convex transversely; elytra with discal intervals shiny, without granules, costate at base; met-episterna sulcate throughout (sulcus often concealed by powder)
crassirostris Faust.
- 7 (6). Forehead slightly wider than an eye, flatter transversely; elytral intervals with sparse minute granules, not costate at base; met-episterna not sulcate, except at apex *approximans* sp. n.
- 8 (5). Forehead with a short median sulcus at about middle of eyes.
- 9(12). Elytra clothed only with narrow setiform scales.
- 10(11). Rostrum much longer than its basal width, parallel-sided in its basal half, broadly dilated at the genae, the dorsal area rapidly narrowed basally and there much narrower than the forehead; elytra unevenly clothed with coppery setae; front femora with a small tooth
cuprisetis sp. n.
- 11(10) Rostrum about as long as its basal width, narrowed from base to antennae, only slightly dilated at the genae and there not wider than at base, the dorsal area subparallel-sided in its basal half and there nearly as wide as the forehead; elytra with uniform grey setae; front femora with a large tooth *griseus* sp. n.
- 12 (9). Elytra with patches of round or ovate scales among the setiform scales.
- 13(14). Funicle with joint 2 distinctly longer than 1; forehead broadly depressed; elytra with apices shortly produced and acuminate
disjunctus Faust.

- 14(13). Funicle with joint 2 not longer than 1; forehead flat; elytra without any definite marginal stripe.
- 15(16). Rostrum not longer than its basal width, gradually narrowed from base to antennae, slightly dilated at the genae and there scarcely wider than at base; prothorax truncate at base; elytra with the apices separately rounded, not produced *sartus* sp. n.
- 16(15). Rostrum longer than its basal width, parallel-sided in the basal half, strongly dilated at the genae and there much wider than at base; prothorax shallowly bisinuate at base; elytra with the apices separately and sharply acuminate and shortly produced.
- 17(18). Rostrum separated from head by a shallow impression, the lateral longitudinal sulcus in front of eye broad, shallow and oblique; prothorax narrower at base than at apex; setae on elytra and pronotum dark *sparsutus* sp. n.
- 18(17). Rostrum separated from head by a deep impression, the lateral sulcus very deep, narrow and parallel to the dorso-lateral carina; prothorax not narrower at base than at apex; setae on upper surface pale *nebulosus* sp. n.

***Crinorrhinus approximans* sp. n.**

♂♀. Derm dull black to piceous; prothorax with sparse short pale setae dorsally and usually with an indefinite lateral stripe of narrow yellowish scales; elytra with fairly dense short fulvous setae and scattered groups of small yellowish ovate scales towards sides and apex, especially in the striae; underside with fairly dense narrow pale scales and sparse suberect setae, often with whitish powder.

- *Head* shiny, almost impunctate, with subrecumbent pale setae and sometimes subrecumbent narrow scales; forehead very slightly broader than an eye, flat, with a round median fovea. *Rostrum* separated from head by a well-marked impression, somewhat longer than its basal width, very slightly narrowed from base to antennae, moderately dilated at the genae and there a little wider than at base; the dorsal area impunctate, shallowly depressed, rarely with a very short median carina at apex, the lateral carinae rapidly convergent behind, almost straight; the lateral areas with a carina joining the dorso-lateral one beyond middle, and below it a broad longitudinal sulcus and a shallow one below this. *Antennae* with the scape curved beyond middle; funicle with joint 2 a little longer than 1, and 3 slightly longer than 4. *Prothorax* feebly rounded laterally, not or but slightly narrowed at apex and there not narrower than the bisinuate base, postocular lobes moderate; dorsum rugosely punctate, with a trace of a median carina and two round shallow postmedian depressions. *Elytra* almost parallel in ♂ from the roundly rectangular shoulders, widened behind middle in ♀, separately subacuminate at apex; the shallow striae with strong close punctures, the intervals flat or feebly convex, with numerous minute granules. *Legs* with sparse pale setae, the posterior femora with a subapical patch of narrow scales; the femoral tooth large, triangular.

Length 4.5–6.5 mm., *breadth* 1.6–3.0 mm.

INDIA: Bombay Pres., Matheran, 2500 ft., 5 ♂, 4 ♀ (type); Bombay, Surat, 1 ♂, viii.1904 (*H. M. Lefroy*); Bombay, Belgaum, 1 ♂, iv.1908; Bombay, Bassein, 1 ♂, 1 ♀, x.1909; Orissa, Puri, Khurda, 1 ♀; Central Prov., Hoshangabad, Rahabgaon, 1 ♂, 4 ♀, defoliating teak, viii.1926 (*S. N. Chatterjee*).

Closely allied to *C. crassirostris* Faust, which differs, in addition to the characters given in the key, in having no broad scales on the elytra, which appear to be normally covered with white powder, of which there is no trace in *approximans*.

***Crinorrhinus cuprisetis* sp. n.**

♂♀. Derm red-brown; prothorax with rather sparse pale setae which do not form a denser stripe laterally; elytra with rather dense yellowish setae having a coppery reflection, more or less variegated with almost bare indefinite spots and patches on the disk; under-side thinly and evenly clothed with finer grey or coppery setae.

Head with coarse close shallow punctation and evenly setose; forehead about as broad as an eye, flat, with a short median sulcus anteriorly. *Rostrum* separated from head by a deep impression, much longer than its basal width, parallel-sided in the basal half and strongly dilated at the genae; the dorsal area coarsely but shallowly punctate, somewhat depressed in the middle, the lateral carinae converging rather rapidly behind, with a feeble narrow median carina on the anterior half and a variable obtuse transverse ridge near apex; the lateral areas with a carina (and rarely a second) close to the dorso-lateral one and uniting with it above the scrobe, and below it a deep longitudinal sulcus and a curved one beneath this. *Antennae* with the scape almost straight; funicle with joint 2 equal to 1 and 3 equal to 4. *Prothorax* rounded laterally, widest at middle, narrowed but not constricted at the apex, which is a little narrower than the bisinuate base, postocular lobes distinct; dorsum closely and coarsely punctate, with a variable median carina (sometimes almost complete), a shallow transverse impression beyond middle and two round postmedian depressions. *Elytra* with rather oblique shoulders, almost parallel in ♂, somewhat dilated behind middle in ♀, the apices separately rounded; the shallow striae with strong separated punctures, the intervals somewhat broader than the striae, feebly convex and with numerous minute granules. *Legs* with rather sparse pale setae, the hind femora only with a denser band near apex; the femoral tooth small, but triangular, and continued distally as a carina.

Length 5.5–7.5 mm., breadth 2.5–3.3 mm.

INDIA: 2 ♀; Bombay, 2 ♂ (*N. B. Kinnear, E. M. Janson*—type); Eastern Bengal, 1 ♀, viii.1907 (*B. Singh*).

***Crinorrhinus griseus* sp. n.**

♂♀. Derm piceous to red-brown, rather thinly but even clothed above and below with short recumbent greyish setiform scales.

Head impunctate, thinly setose; forehead as broad as an eye, shallowly depressed and with a short median sulcus. *Rostrum* very shallowly separated from head, about as long as its basal width, narrowed from base to antennae, only slightly dilated at the genae and there not wider than at base; the dorsal area plane or shallowly depressed, almost parallel-sided in its basal half and there nearly as wide as the forehead; the lateral area with a fine carina uniting with the dorso-lateral one at middle and a short narrow sulcus adjoining it; one deep and one or two shallow sulci below the scrobe (usually hidden by scaling). *Antennae* with the scape rather strongly curved; funicle with joint 2 somewhat longer than 1, and 3 slightly longer than 4. *Prothorax* feebly rounded laterally, widest at the middle, base and apex of equal width (♀) or the base slightly narrower (♂), subtruncate at the base, the postocular lobes distinct; dorsum closely and coarsely punctate, the median carina more or less obsolete in ♀ and absent in ♂, with a shallow transverse impression beyond middle, the postmedian depressions very shallow and indefinite. *Elytra* parallel-sided from the roundly rectangular shoulders to beyond middle in ♂, only slightly wider behind middle in ♀, the apices separately rounded; the shallow striae with relatively small close punctures, the intervals broader than the striae, almost flat, without granules. *Legs* with sparse pale setae and no denser patch on the femora; femoral tooth rather large, triangular and carinate distally.

Length 3.7–5.0 mm., *breadth* 1.5–2.5 mm.

INDIA : W. Bengal, Chota Nagpur, Barwa, 7 ♂, 14 ♀ (*P. Cardon*).

***Crinorrhinus sartus* sp. n.**

♂♀. Derm red-brown, with fairly dense narrow (but not setiform) whitish scales, which are more sparse on the disk of the pronotum and sometimes replaced by brownish scales, the elytra mottled with variable confluent patches of brown scales; underside with uniform narrow grey scales.

Head with very shallow close punctation; forehead about as broad as an eye, flat, with a short median sulcus. *Rostrum* separated from head by a comparatively shallow impression, gradually narrowing from the base to the antennae, only slightly dilated at the genae and there scarcely wider than at the base, its length equal to its apical width; the dorsal area almost flat, more or less aciculate, without distinct punctures, with sparse setiform grey scales, the sharp lateral carinae slightly converging posteriorly, the median carina very fine and sometimes obsolescent; the lateral areas with a more or less distinct oblique carina near the dorso-lateral carina and uniting with it beyond the middle, and below this a very broad shallow squamose sulcus from base to scrobe; no sulcus below the scrobe. *Antennae* with the scape rather strongly curved; funicle with joint 2 slightly shorter than 1, 3 and 4 equal. *Prothorax* moderately rounded in the middle, shallowly constricted and of equal width at base and apex, the postocular lobes almost obsolete, the base truncate; dorsum closely punctate, with a very short low median costa behind middle, a low sublateral costa from base to middle, and a broad shallow transverse impression beyond middle, the usual two round postmedian impressions absent. *Elytra* slightly widened behind middle in ♂, more so in ♀, the shoulders prominent and roundly rectangular, the apices separately rounded; the shallow striae with strong punctures, the intervals slightly convex, smooth and shiny. *Legs* with fairly dense narrow pale scales; femora with a large triangular tooth.

Length 4.0–5.5 mm., *breadth* 1.5–2.2 mm.

INDIA : United Provinces, Fyzabad, 3 ♂, 3 ♀ (*R. W. G. Hingston*).

***Crinorrhinus sparsutus* sp. n.**

♂. Derm red-brown; prothorax with narrow inconspicuous dark scales on the disk and a broad lateral stripe of wider yellowish scales; elytra with very minute sparse brownish setae and scattered irregular spots (often confluent) of ovate fulvous scales, which are mostly in the striae and not more numerous laterally; underside with fairly dense white scales and white powdering.

Head aciculate, with sparse fine dark setae and a dense ring of fulvous scales round the eyes; forehead flat, about as wide as an eye, with a deep median sulcus. *Rostrum* longer than its basal width, separated from head by a rather shallow impression, parallel-sided in the basal half and strongly dilated at the genae; the dorsal area finely aciculate, impunctate, shallowly impressed in the middle, with a short median carina at the apex, the lateral carinae gradually converging behind; the lateral areas with an oblique carina uniting with the dorso-lateral carina beyond middle, and below it a very broad shallow oblique sulcus; a curved squamose sulcus below the scrobe. *Antennae* with the scape rather strongly curved; funicle with the two basal joints equal, and 4 as long as 3. *Prothorax* moderately rounded laterally, widest behind middle, constricted at the bisinuate base, which is narrower than the unconstricted apex, postocular lobes feeble; dorsum closely and coarsely punctate, with a trace of a low abbreviated median costa and a short sublateral costa on each side at base, the two round postmedian impressions distinct.

Elytra parallel (♂) from the rounded rectangular shoulders to behind middle, the apices separately and rather sharply produced; the shallow striae with large separated punctures, the intervals not or but slightly wider than the striae, feebly convex, smooth and shiny. *Legs* with sparse narrow pale scales and a patch of dense scaling near the apex of the femora; femoral tooth small, but triangular, and continued distally as a carina.

Length 5 mm., breadth 2 mm.

INDIA : United Provinces, Fyzabad, 3 ♂, 3 ♀ (*R. W. G. Hingston*).

***Crinorrhinus nebulosus* sp. n.**

♂♀. Derm picceous to red-brown, rather thinly clothed above with pale setae and with denser ovate fawn scales forming vague irregular patches, sometimes uniting to cover most of the elytra; underside with narrow whitish scales.

Head with transverse wrinkles on the vertex, almost impunctate and with dense narrow scales anteriorly; forehead wider than an eye, flat, with a short deep sulcus in front partly concealed by scaling. *Rostrum* separated from head by a deep impression, longer than its basal width, parallel-sided from base to scrobes and strongly dilated at the genae; the dorsal area rather deeply depressed, shallowly to obsoletely punctate, with a low median carina anteriorly, the lateral carinae moderately converging behind; the lateral areas with a strong carina uniting with the dorso-lateral one at about middle and immediately adjoining it externally a very deep narrow straight sulcus that is often partly concealed by the dense scaling on this area, and below this another very deep curved sulcus that is always concealed by scaling. *Antennae* with the scape moderately curved; funicle with joints 1 and 2 equal, 3 longer than 4. *Prothorax* slightly rounded laterally, widest at the middle, the apex a little narrower than the shallowly bisinuate base; dorsum with coarse close punctation, which is mostly concealed by scaling, the median carina very short and the postmedian impressions indistinct. *Elytra* widest behind middle in both sexes, obliquely rounded at the shoulders, the apices separately produced and acuminate; the shallow striae with rather large foveae that are more or less covered by scaling, the intervals not wider than the striae, feebly convex, shiny and without granules. *Legs* with rather sparse narrow whitish scales, with a denser subapical band on the posterior pairs; femoral tooth small, but triangular, and continued distally as a carina.

Length 6.5–7.5 mm., breadth 2.5–3.5 mm.

INDIA : W. Bengal, Chota Nagpur, Barwa, 8 ♂, 9 ♀ (*P. Carlon* -type); Central Prov., Balaghat, Baihar, 3 ♂, 3 ♀, on *Terminalia orjuna* and *Lagerstroemia parviflora*, vii.1927 (*B. M. Bhatia*), C.P., Banjar Mandla, Kanha, 1 ♀, i.1927 (*B.M.B.*).

BOOK NOTICES.

Insect pests of stored products. By H. HAYHURST, photographs by H. BRITTEN. 2nd edition. 8vo. London (Chapman and Hall), 1942. Price 15s. pp. x + 108, 55 pls.

The first edition of this work appeared in 1940 and was noticed in the *Proceedings* of that year. The fact that a second edition was required in so short a time indicates the need for a good book on the subject.

In the present edition a chapter on Siphonaptera has been added at pp. 43-45 with pls. 45-50 as illustrations and a list of parasitic and predacious insects and their hosts on p. 84. A bibliography extending to 21 pages has also now appeared for the first time. The main part of the text is printed unchanged from the first edition.

The same misprints appear on the explanations of plates: for example, the author's name Boield is several times wrongly given as "Boeild," and there are many inaccuracies in the Bibliography.

Insetos do Brasil. By A. DA COSTA LIMA. 3°. Tomo. Homópteros. pp. 327, 267 figs. 8vo. (Rio de Janeiro), 1942. Escola nacional de Agronomia Série Didática 4.

This third volume of Dr. da Costa Lima's book is on the same lines as the earlier ones. It is concerned with the superfamilies Cicadoidea, Fulgoroidea, Membracoidea, Cercopoidea, Jassoidea, Psylloidea, Aphidoidea, Aleyrodoidea, and Coccoidea. In each case the characters of the superfamily are given and this is followed by the details of the several families, including general details and habits. Some notes are then given of the more interesting species and, in the case of noxious insects, methods of combating them. A generous supply of figures is given and each chapter is provided with a bibliography.

Outlines of Entomology. By A. D. IMMS. pp. viii + 184, 96 figs. 8vo. London (Methuen) (1942). Price 12s. 6d.

"This book is intended for anyone who is willing to take sufficient pains to acquire an elementary knowledge of entomology as a branch of general zoology." The five chapters of the book deal with I. introduction; II. anatomy and physiology; III. embryology, growth and metamorphosis; IV. nomenclature and classification; and V. relationships of insects.

Notwithstanding the statement "This book is produced in complete conformity with the authorized economy standard," it is well and clearly printed and the only apparent effect is a volume less than half-an-inch in thickness.

Most of the illustrations are original. The author notes in his preface that some inconsistencies are to be found between this new work and his well-known *General Textbook of Entomology*, and adds that these will be corrected when circumstances permit the publication of a revised edition of the latter.

PEDRONIA STROBILANTHIS GREEN REDESCRIBED (HOMOPTERA,
COCCOIDEA : PSEUDOCOCCIDAE)

By Raymond MAMET.

(Rose Hill, Mauritius.)

TYPICAL specimens of this species have been received from Mr. E. E. Green and carefully studied in order to supplement his original description.

Though the specimens on which the present study is based were in a dry state, they had apparently been removed from their preservative fluid which has more or less completely dissolved their secretory matter. In addition, all the limbs of the individuals examined were broken except, however, the coxae and, in two specimens, the hind femora and trochanters, which were in a good state of preservation. I will, therefore, quote the characters given in the original description, in respect of organs that could not be studied. References to the original description are placed between quotation marks and Green's name placed between brackets at the end of such quotations.

Thanks are due to Mr. E. E. Green who, with his usual kindness, has most readily sent me this part of his type material for study.

Pedronia strobilanthis Green.

1922, *The Coccidae of Ceylon* 5 : 364, pl. CXLIV.

Adult female elongate oval (fig. 1, *a*). "naked; brownish-red to purple-brown, with longitudinal series of small colourless glassy spiniform paired processes arising from stout sharply pointed conical spines arranged as in fig. 3" (Green). The arrangement of these spines (fig. 1, *a*) varies very little except, however, in the number of spines constituting the groups in the lateral longitudinal series on the abdominal region where they vary from 1 to 3 spines per group; when these spines in this series are in pairs or more, one is distinctly smaller than the rest (fig. 1, *b* and *b*¹). The size of the spines varies: (1) those of the marginal series are smaller than those of the median longitudinal series and amongst themselves they show a small amount of variation in size: those of the abdominal and thoracic marginal regions are stouter than those of the frontal marginal region (fig. 1, *c* and *d*); (2) the spines of the lateral longitudinal series, *i.e.*, the series situated between the marginal and median longitudinal series, are distinctly stouter than those of the marginal series but smaller than those of the median longitudinal series; (3) the spines of the median longitudinal series (fig. 1, *l*) are distinctly stouter than the rest, especially in the abdominal region. All the spines, whether in the marginal, lateral or median series, are situated on short and conspicuous peduncles and are not accompanied by any pore; base of spines about $\frac{1}{2}$ to $\frac{3}{4}$ length of spines. *Eyes* normal, marginal. *Antennae* (fig. 1, *f*) short and stout; "six" (Green) or seven-jointed; terminal joint always the longest; second joint with a distinct sensorial pore near its apex. "Formula of six-jointed antenna: 6, 3, 1, (2, 5), 4" (Green). Formula of seven-jointed antenna: 7, (1, 2, 3), 6, (4, 5). Distance between antennal bases about $\frac{1}{2}$ length of seven-jointed antenna. *Mouth-parts* fairly developed; mentum obscurely dimerous, apex bluntly pointed, base nearly equal to length; rostral loop extending up to the insertion of the mid legs. Anterior and posterior spiracles normal, without parastig-

¹ Fig. 3 of Plate CXLIV of *Coccidae of Ceylon*.

² Green's formula for the seven-jointed antenna runs as follows: 7, (1, 2), 6, (3, 4, 5).

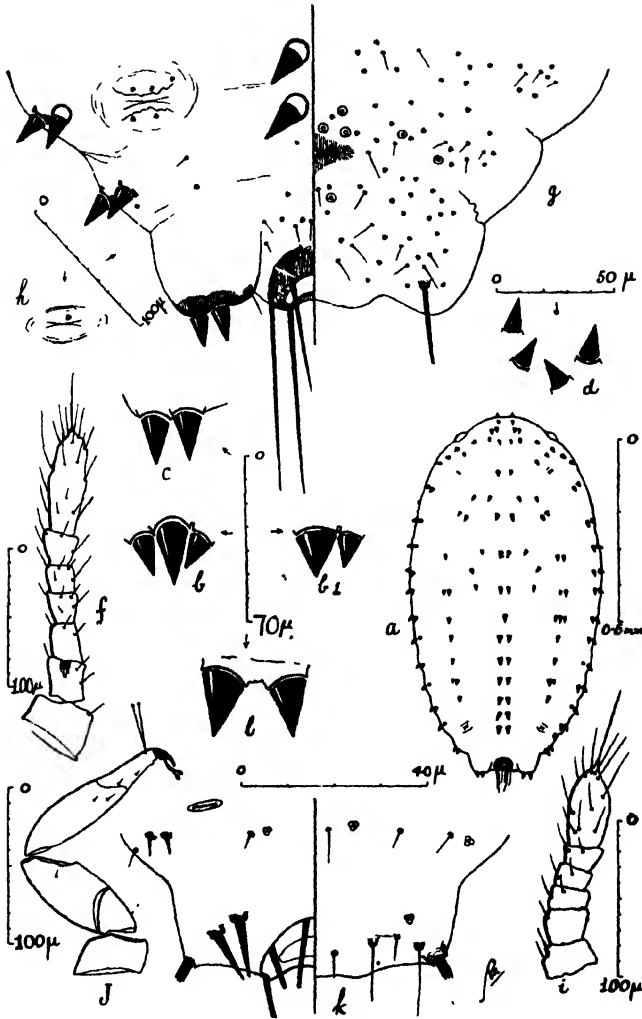


FIG. 1.—*Pedronia strobilanthus* Green—*a*, dorsal view of adult female; *b* and *b*¹, spines from lateral longitudinal series; *c*, paranal lobe spines; *d*, spines from frontal marginal region; *e*, spines from median longitudinal series; *f*, 7-jointed antenna; *g*, posterior extremity of adult female; *h*, anterior ostiole of adult female; *i*, antenna of larva; *j*, third leg of larva; *k*, posterior extremity of larva.

matic pores. "*Limbs* stout; tarsus (of mid leg) shorter than tibia; the two together scarcely longer than femur with trochanter; tarsal digitules slender, slightly knobbed; claw sharply pointed. I have been unable to detect any unguis digitules" (Green).³ Coxa of hind pair of legs with a few minute translucent pores. *Posterior extremity* (fig. 1, *g*) with broadly rounded and faintly sclerotised *paranal lobes* bearing, on their dorsal surface and near their apex, two stout conical spines which are not accompanied by any concentration of pores or by auxiliary setae. On their ventral surface, the paranal lobes bear a fairly long seta, the anal lobe seta, arising from below their apex, and a few auxiliary short setae. *Anal ring* with six setae and the usual double row of beads of the ordinary types. According to Green's figure of the posterior extremity of the adult female, the anal lobe seta is distinctly shorter than the anal ring setae. There are no true *cerarii*, but the marginal series of paired conical spines, already referred to. *Dorsal dermis* with very few and sparsely distributed trilocular pores, very few short setae and the stout conical spines described above. *Ventral dermis* fairly crowded with trilocular pores; very few large *discooid pores* present around the vulvar region only. *Ventral setae* fairly numerous, especially in the frontal area where they are longer and stouter than anywhere else on the venter. Anterior and posterior dorsal *ostioles* small; anterior ostiole (fig. 1, *h*) smaller. Ventral ostiole not found.

Length: 1.0–1.2 mm.; breadth: 0.5–0.6 mm.

"No ovisac is formed, the insects being ovoviviparous" (Green).

Larva (from embryonic specimens only) elongate oval with stout six-jointed antennae (fig. 1, *i*); terminal joint longest. Limbs (fig. 1, *j*) stout; claw acutely pointed, without denticle; tarsal and unguis digitules fairly developed. Posterior extremity as shown in fig. 1, *k*. Anal ring large, with six setae. Dorsal dermis with stout setae and few trilocular pores; ventral dermis with more numerous trilocular pores and slender setae. Length: 0.40 mm.

"*Male puparium* pure white; narrow, about twice as long as broad; posterior extremity open. Length, 1.75 mm." (Green).

Host and Type Locality.—"On under surface of leaves of *Strobilanthes* sp.; CEYLON: Pedrotalagala (7000 ft.), Nuera Eliya" (Green); March 1898.

Remarks.—I here quote Mr. Green's remarks on this species:—

"The female insects are unusually active and move about with considerable rapidity.

"Although the character and arrangement of the spines is suggestive of the ERIOCOCCINAE, the abdominal extremity has not the highly chitinous and modified lobes characteristic of that family; and the terminal joint of the antenna is more like that found in *Pseudococcus* and its allies."

It may be added that the presence of dorsal ostioles will separate this species from the ERIOCOCCINAE.

Material examined.—Six adult females and three embryonic larvae from the type material received from Mr. E. E. Green.

The following generic diagnosis is based on the preceding description:—

Generic diagnosis of *Pedronia* Green.

Referred to the PSEUDOCOCCIDAE.

Adult female elongate oval, naked, neither enclosed in a sac nor producing an ovisac; ovoviviparous. Antennae six- to seven-jointed, terminal joint elongate and longest. Mouth-parts normal. Limbs stout; claw of legs presumably without denticle. Body

³ As already mentioned, the limbs of the specimens forwarded to me by Mr. Green were all broken, except the coxae and, in two individuals, the hind femora and trochanters. I have been able to detect fairly developed unguis digitules in the larval stage.

with stout, conical, pedunculate spines on both dorsum and margin; these spines are distributed as follows: (i) a median dorsal longitudinal series composed of paired spines, (ii) a lateral dorsal longitudinal series composed of groups of 1-3 spines, (iii) a marginal series composed of paired spines. All these spines are accompanied neither by pores nor by setae. Dorsal dermis with very few trilocular pores and short setae. Ventral dermis with many trilocular pores, a few large discoid pores confined to the vulvar region, and fairly numerous longish setae. No true cerarii present. Anal ring normal, with two rows of beads and six setae. Dorsal ostioles small.

Larva (embryonic specimens only) elongate oval. Antennae stout, six-jointed, terminal joint longest. Claw of legs without denticle. Dermis with setae and trilocular pores. Anal ring with six setae.

Remarks.—The descriptions I have already given of this genus (Mamet 1937 : 173 and 1939 : 214) can stand as far as *Pedronia strobilanthis* Green and *P. strobilanthis tenuispina* Green are concerned. It has been necessary to erect a new genus for the reception of *Pedronia greeni* Mamet and *P. mauritiana* Mamet in another paper already published (Mamet 1942) in which re-descriptions of these species have been included.

Pedronia spinigera Goux (1937 : 455), in my opinion and in that of Mr. Green (*in litt.*), does not belong to the genus *Pedronia* but apparently to *Acanthococcus* Kiritshenko (1935 : 155). The name of that genus is preoccupied by *Acanthococcus* Signoret (1875 : 34) which is itself a synonym of *Eriococcus* Targioni Tozzetti.

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THE EARLY STAGES OF *AÈDES TAYLORI* EDWARDS AND
A. FURCIFER EDWARDS (DIPT., CULICIDAE)

By D. J. LEWIS, M.A., F.R.E.S.

(*Entomologist, Sudan Medical Service.*)

Aedes (Diceromyia) taylori Edwards, 1936.

Larva. Head. Antenna spiculate, with single or double seta near $\frac{1}{2}$. Setae A, B and C with 6, 2 and 3 sub-plumose branches respectively; B in front of C. D with 6-10 branches. Mentum with outer teeth widely spaced. *Thorax.* Straight spines on meso- and metapleural plates. Well-developed stellate tufts of setae on dorsum. *Abdomen.* Numerous stellate tufts. Comb composed of about 10 simple spines in a straight row. Siphon dark brown, long, index 4.3 or 4.4; pecten extending to about $\frac{1}{2}$, composed of 20-22 evenly spaced stout teeth, each with 3 or 4 secondary denticles; sub-ventral tuft just beyond pecten, 2-3 branched. Anal segment with posterior edge of saddle spiculate, upper caudal seta 6-branched, lower single, lateral seta 3- or 4-branched; ventral brush composed of 4 pairs of 4 or 5-branched tufts all within barred area, anterior tufts much shorter than posterior; gills rounded, upper pair about as long as segment and longer than lower.

Pupa. Trumpet brown with pale tip, narrow, and contracted apically. Lower post-ocular seta very long, single or double. Lower anterior antero-thoracic seta single, as long as or longer than lower postocular. Dorsal seta with 2-4 branches, nearly as long as trumpet and slightly longer than supra-alar. O and P single, R with 2 branches. P about 2 or 3 times as long as O and R. Float-hair with short stem and 5-12 sub-plumose branches. H short. K single, about 8 times as long as H. C II with 3 or 4 branches, C III with 3-5, C IV and V with 3 or 4, C VI with 1-3 and C VII single or double. B single, on II-V longer than segment, on VI about as long, on VII shorter than segment. A VII single, A VIII with 5-7 branches, more than half as long as paddle. Paddle approximately oval, with strong midrib and practically no external buttress, margin minutely denticulate before middle; seta single, slightly longer than paddle.

SUDAN: Nuba mountains, Heiban, tree-holes, 2.vii.41, 12.x.41, 2 larval and 3 pupal pelts (*D.J.L.*).

Aedes (Diceromyia) furcifer Edwards, 1913.

Little material is available at present but it is enough to show differences between Sudan specimens of the two closely related species. Some of these differences may later prove to be invalid if there is much variation. The larva of *A. furcifer* has been described from eastern Transvaal specimens by Ingram and De Meillon (1929). Sudan specimens show at least one distinct difference from the South African form in having a much longer siphon, an unusual feature in a tree-hole breeder. The pupa of *A. furcifer* has been described by Macfie and Ingram (1927) and Edwards (1941) from a single damaged specimen from the Gold Coast. Several details are added below. There are some small differences between the Sudan and West African specimens.

Larva. Differs from *A. taylori* as follows. *Head.* Seta A 9-branched, B 2- or 3-branched and C 5- or 6-branched. D with about 13 branches. *Abdomen.* Siphonal index 3.3 to 3.6, pecten with 20-29 teeth, slightly more than $\frac{1}{2}$ length of siphon, subventral tuft 4-branched.

The mentum has 11 or 12 teeth on each side of the central tooth, the outer 4 on each side being widely spaced.

SUDAN: Heiban, tree-holes, 24, 30.vi.41, 2.vii.41, 2 larval and 3 pupal pelts all slightly damaged (*D.J.L.*).

Pupa. Trumpet not contracted apically, opening more oblique than in *taylori*. Lower postocular seta double or triple. O and R with 2 or 3 branches. Float-hair with 14-18 branches. M 3- to 7-branched, C II 4- or 5-branched, C V 2- to 4-branched, C VI double. A VII single or double, A VIII 4- to 6-branched. Paddle with distal end more flattened in outline than in *taylori*, seta about $\frac{2}{3}$ as long as paddle.

Heiban, 24 and 30.vi.41, 2.vii.41, 3 slightly damaged pelts (*D.J.L.*).

Specimens will be sent to the British Museum (Natural History).

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ON THE CORRECT NAME OF THE SPECIES COMMONLY KNOWN
AS *ARGYNNIS AGLAJA* (LINNAEUS, 1758) (LEP. NYMPHALIDAE) AND MATTERS INCIDENTAL THERETO

By Francis HEMMING, C.M.G., C.B.E.

THE specific name *Argynnis aglaja* (Linnaeus, 1758) commonly applied to the Nymphalid species popularly known in this country as the "Dark Green Fritillary" is invalid and must therefore be replaced by the oldest name nomenclatorially available for that species. The object of the present paper is to determine what is the oldest available name, to draw attention to the generic name properly applicable to this species, and to clear up certain questions relating to the subspecific nomenclature of this species that arise on the determination of its correct specific name.

(A) THE THREE OLDEST NAMES FOR THIS SPECIES.

(1) *Papilio aglaja* Linnaeus, 1758, *Syst. Nat.* (ed. 10) : 481 no. 140.

2. This name is invalid as it is a homonym of *Papilio aglaja* Linnaeus, 1758, *Syst. Nat.* (ed. 10) : 465 no. 44, the name given by Linnaeus to the species of PIERIDAE now well known under the name *Delias aglaja* (Linnaeus, 1758).

3. Linnaeus himself realised later that in the 10th edition of the *Syst. Nat.* he had given the name *Papilio aglaja* to two entirely different species. Accordingly in 1767 he attempted to remedy this mistake by bringing forward the name *Papilio pasithoe* Linnaeus (1767, *Syst. Nat.* (ed. 12) 1 (2) : 755 no. 53) as a substitute for one of these names. Unfortunately, the name that he replaced in this way was not the name that he had given to the Nymphalid species here under consideration but that given to the Pierid species, notwithstanding the fact that it was on that species and not the Nymphalid that he had first conferred the name. In consequence, under the present International Code, which binds Linnaeus as much as any subsequent author, Linnaeus failed in his object, which was to furnish each of these species with a nomenclatorially available name. All that he did was to add a synonym for the Pierid species, while still leaving the Nymphalid species without a valid name.

4. In an endeavour to preserve the name *aglaja* Linnaeus for the Nymphalid species, an attempt has been made to build up a case for so doing under one or other or both of the following grounds :—

(i) that as the two names in question, *i.e.* *Papilio aglaja* for the Pierid species no. 44 and *Papilio aglaja* for the Nymphalid species no. 140, are of the same date, Linnaeus may properly be regarded as the first reviser and therefore as being entitled under Article 28 of the Code (the first part of which is applied to specific and subspecific names by the second part) to select which of the two names should stand and which should be rejected ;

(ii) that on the analogy of Recommendation (t) in Article 30 (III) of the Code, the observance of the principle of "page precedence" may properly be regarded as optional for the purpose of determining synonymy.

5. Both these lines of argument are unsound and fall to the ground :-

(a) argument (i) is unsound :—

(i) because Article 28 is expressly limited to cases where a genus (or a species) is formed by the union of two or more genera (or species) and has no bearing whatever on a case such as the present which is concerned only with the status of a name applied by its original author to two different species placed by him in the same genus in the same work; and

(ii) because Article 35 expressly states that “ a specific name is to be rejected as a homonym when it has previously been used for some other species or sub-species in the same genus ” and Article 36 states that “ rejected homonyms can never be used again ”;

(b) argument (ii) is unsound :—

(i) because Recommendation (t) in Article 30 (III), which indicates that the observance of page precedence is to be regarded as optional in certain cases is confined in its application to cases where the question under consideration is not the rejection of names (which is dealt with in Articles 32–36 in a different part of the Code) but the principles which it is advisable that a later author should follow when selecting a type for a genus where the original author failed either to designate or to indicate a type; and in consequence this Recommendation has no bearing whatever in a case such as the present; and

(ii) because, even if it were possible to argue in this way from Recommendation (t) in cases where two different names were given to a single species in the same work (which is a quite different case from that now under consideration), this course would still only be admissible “ all other things being equal,” and in consequence this argument could have no possible bearing on a case where one of the names is a homonym either of the other name (as in the present instance) or of some name published in another work of the same date, for in neither of these cases are “ all other things ” “ equal,” as a Recommendation (such as Recommendation (t)) could in no circumstances override the express provisions in Article 35 and 36 (quoted in (a) (ii) above) by which homonyms must be rejected and, once rejected, can never be used again.

6. The only remaining way by which an attempt might be made to retain the name *aglaja* Linnaeus for the Nymphalid species would be to invite the International Commission for Zoological Nomenclature to render an Opinion, under “ Suspension of the Rules,” declaring that this name should be so retained, notwithstanding the fact that it is a homonym. It is important to realise that, although the International Commission have been vested with “ plenary powers ” to suspend the rules, those “ plenary powers ” were given to the Commission by the International Zoological Congress subject to the condition that they are only to be used in cases where in the judgment of the Commission “ the strict application of the rules will clearly result in greater confusion than uniformity.” The strict application of the rules in the present case would certainly cause inconvenience through the suppression of a well-known name, but causing inconvenience is a very different thing from causing “ greater confusion than uniformity ” and it would be very difficult to establish a case to show that the latter would arise if the rules were strictly applied and the name *Papilio aglaja* Linnaeus for the Nymphalid species were sunk as a homonym. Moreover, it should be observed that the International Commission have never yet used their “ plenary powers ” to validate a homonym, and in view of the

express terms of Articles 35 and 36 of the Code and of the importance attached by the Commission to the principle embodied in those Articles an application that involved the suspension of the rules in this manner would need to be extremely strong before the International Commission would be likely to give a favourable response. For these reasons it is most improbable that any application to the International Commission for an Opinion suspending the rules so as to retain the name *Papilio aglaja* for the Nymphalid species would be successful. At the present time this is a purely academic question since no such application has been made to the Commission. As things stand today, the above name is an invalid homonym and as such must be rejected.

7. In his original description of the Nymphalid *Papilio aglaja* in the 10th edition of the *Syst. Nat.*, Linnaeus gave no locality for it, but he gave an indication of its locality by citing as a primary reference (to one of his own earlier works) the reference "Fn. svcc. 780", for this citation shows that his type material was of Swedish origin. Both in the 1st edition of the *Faun. suec.* (the edition cited by Linnaeus) and in the second edition published in 1761 Linnaeus used in connection with the locality of this species the phrase "Habitat in hortis," thereby indicating that in Sweden this was a widely distributed species found in gardens. It is reasonable and legitimate to infer that the specimens of this species on which Linnaeus based his description were captured by himself and further that they were captured in the neighbourhood of his home. Linnaeus was then living at Uppsala and had been so doing for 17 years (*i.e.* ever since 1741), and it may therefore be concluded that the type of the Nymphalid *Papilio aglaja* Linnaeus, 1758, was a specimen taken in the neighbourhood of Uppsala.

- (2) *Papilio emilia* Quenzel, 1802, in Acerbi, *Travels Sweden Finland Lapland* 2 : 253 pl. [2] figs. 1 ♂ (upperside), 2 ♂ (underside of the same specimen)
"Lapland."

8. This name is frequently attributed to Acerbi, in whose work it was published, but there is the following statement by Acerbi himself, at the foot of page 252, immediately before the definitions of new species of insects, which begin on page 253, that the author of those definitions was Dr. Quenzel :—

"I shall now add the essential characters of the insects exhibited upon the annexed plates, as they are described by that acute and diligent naturalist, Dr. Quenzel."

9. Neither Quenzel nor Acerbi gave a locality for *Papilio emilia* Quenzel, but it is clear that the specimen upon which the definition of that species was based was taken in Lapland, since the page upon which it occurs (p. 253) is comprised in Section XV of this part of Acerbi's work, which is entitled "Of the Insects and Testaceous Animals of Lapland."

10. Quenzel's definition of *Papilio emilia* reads as follows :—

Papilio emilia : alis superioribus fuscis, lunulâ mediâ fulvâ; inferioribus dentatis, supra lutescentibus, nigro-maculatis, infra virescentibus, maculis circiter sedecim rotundis argenteis.

11. The actual plate is unnumbered, bearing only the legend "To face page 253 Vol. II", but the number "II" is assigned to it in the text facing it. The figure of the upperside (fig. 1) represents a slightly aberrant example of the species described by Linnaeus in 1758 as *Papilio aglaja*; the black markings on

the fore-wings are slightly obsolete and those on the hind-wing slightly confluent. The figure of the underside of the same specimen (fig. 2) represents the underside of a typical example of the North Scandinavian subspecies of this species.

12. The name *Papilio emilia* Quenzel, 1802, is invalid, since it is a homonym of *Papilio emilia* Cramer, [1779] (*Util. Kapellen* 3 (19) : 50).

(3) *Papilio charlotta* Haworth, 1803, *Lep. brit.* (1) : 32 "Comitatus Bedfordiensis."

13. The above is the first nomenclatorially valid publication of the name *Papilio charlotta* Haworth, since its anonymous publication by Haworth in the preceding year (1802, *Prodromus Lep. brit.* : 3) is invalid, the name there being a complete *nomen nudum*, apart from the indication "Bedford," which (of course) is not sufficient to validate the name. Haworth thought that the insect to which he gave this name was a new species, but it was in fact no more than an aberrant example of the English subspecies of the present species, in which some of the silver markings on the underside of the hind-wings were confluent.

(B) THE OLDEST AVAILABLE NAME FOR THE SPECIES.

14. The name *Papilio charlotta* Haworth, 1803, is available nomenclatorially, that name not having been previously published in a different sense. It is also, as shown above, the oldest available name for this species. It is unfortunate that the type specimen of *Papilio charlotta* should have been an aberration, but this does not in any way impair the availability of the name for use as the name for the collective species. From the nomenclatorial point of view all that is relevant in this case is :—

(i) that Linnaeus, Quenzel, and Haworth gave the names *Papilio aglaja*, *Papilio emilia*, and *Papilio charlotta* respectively to what each of these authors regarded as a new species;

(ii) that later investigation has shown that all these three names apply to a single species;

(iii) that the name *Papilio aglaja* Linnaeus is not available nomenclatorially as it is a homonym of an earlier name and that for a similar reason the name *Papilio emilia* Quenzel is also not available nomenclatorially; and therefore

(iv) that *Papilio charlotta* Haworth is available nomenclatorially and is the oldest name so available.

15. For the reasons set out above, the name *Papilio charlotta* Haworth, 1803, is the name which under the International Code should be treated as the name for the collective species.

(C) THE GENUS TO WHICH THE SPECIES SHOULD BE REFERRED.

16. It has long been apparent that the assemblage of species—over 100 in number—commonly assigned to the genus *Argynnis* Fabricius, 1807, contains species of such diverse structural and other characters that on any revision based on such characters the species in question would necessarily be divided among a considerable number of different genera. Various attempts to establish such genera have been made at different times but these have failed, partly because the characters selected as diagnostic were artificial and partly because none of these attempts covered the whole group of species involved. It was not until this subject was taken up by Reuss in upwards of 20 papers published

between 1919 and 1936 that a comprehensive attack was made upon the problem. More recently, Mr. B. C. S. Warren has re-examined the whole subject, so far as it relates to the Palaearctic species, and in a paper of which he has been kind enough to lend me the manuscript he has set out his conclusions, which in general agree with those reached by Reuss. Mr. Warren's paper is profusely illustrated and is accompanied by a great mass of evidence in support of his conclusions. It is therefore particularly unfortunate that the difficulties involved in wartime in publishing a large illustrated paper have so far prevented the appearance of Mr. Warren's work.

17. It is not possible—nor would it be appropriate—on the present occasion to enter into this subject in detail and it must suffice here to observe :—

(i) that Reuss and Warren are agreed that for various reasons, including differences in the genitalia, it is impossible to regard *Papilio charlotta* Haworth (referred to by Reuss under the invalid name *aglaja* Linnaeus) and *Papilio paphia* Linnaeus as congeneric;

(ii) that, as *Papilio paphia* Linnaeus is the type of *Argynnis* Fabricius, 1807 (see Hemming, 1934, *Gen. Names hol. Butts.* 1 : 59–61), it is necessary to transfer *Papilio charlotta* Haworth to a different genus;

(iii) that the oldest nomenclatorially available genus is *Mesoacidalia* Reuss, 1926 (*Deuts. ent. Z.* 1926 (1) : 69) of which Reuss designated *Papilio aglaja* Linnaeus as the type.

18. The species hitherto known as *Argynnis aglaja* (Linnaeus, 1758) must therefore in future be known as *Mesoacidalia charlotta* (Haworth, 1803).

(D) CERTAIN CHANGES IN THE SUBSPECIFIC NOMENCLATURE OF THIS SPECIES
CONSEQUENT UPON THE DETERMINATION OF ITS CORRECT SPECIFIC
NAME.

19. The names of three subspecies are affected by the determination of the correct specific name of this species :—

(1) *The English and Central European Subspecies.*

20. The name of this subspecies now becomes *Mesoacidalia charlotta charlotta* (Haworth, 1803) with type locality "Bedford." In consequence the name *Argynnis aglaja* Linnaeus race *emilocuples* Verity, 1919 (*Ent. Rec.* 31 : 195–196), type "Berlin," falls as a synonym. Verity (1935, *Entomologist* 68 : 203) gave the distribution of this subspecies (under the name *emilocuples* Verity) as : "Central Europe (including the Alps, up to the highest altitudes of the species, and the south of France to the Hautes Pyrénées) and Siberia to Northern Amurland."

(2) *The South Scandinavian Subspecies.*

21. This is the subspecies to which Linnaeus gave the name *Papilio aglaja*. As shown in paragraph 7 above, the type locality of that subspecies is the "neighbourhood of Uppsala." Now that the name given by Linnaeus is shown to be invalid (see paragraph 2 above), the South Scandinavian subspecies is left without a valid name. I accordingly propose for this subspecies the name :—

***Mesoacidalia charlotta linnaei* nom. n.**

as a nom. nov. pro *Papilio aglaja* Linnaeus, 1758, *Syst. Nat.* (ed. 10) : 481 no. 140, that name being invalid by reason of being a homonym of *Papilio aglaja* Linnaeus, 1758, *Syst. Nat.* (ed. 10) : 465 no. 44. The type locality of *linnaei*

Hemming is automatically the same as that of *aglaja* Linnaeus, namely "neighbourhood of Uppsala."

22. The type of *aglaja* Linnaeus, and therefore also of *linnaei* Hemming, is the pale female in the Linnean collection that bears Linnaeus's own label "aglaja" (see Verity, 1913, *J. linn. Soc. Lond. (Zool.)* **32** : 183).

23. The following are references to published figures of this subspecies:—

Argynnis aglaja Linnaeus, Wahlgren, 1930, *Svensk Insektfauna* **10**, 1 (1) : pl. 7 figs. 4 ♂, 5 ♀.

Argynnis aglaja Linnaeus, Nordström & Wahlgren, [1935], *Svensk. Fjärilar* (3) : pl. 5 fig. 8 ♀.

(3) *The Northern Scandinavian Subspecies.*

24. The oldest name for this subspecies is *Papilio emilia* Quenzel, 1802, but that name, as explained in paragraph 12 above, is invalid as it is a homonym. The only other name that has been given to this subspecies is *borealis* Strand, 1901, but that name (as shown below) is also an invalid homonym. I accordingly propose for this subspecies the name:—

Mesoacidalia charlotta boreas nom. n.

as a nom. nov. pro *Argynnis aglaja* Linnaeus var. *borealis* Strand, 1901, *Nyt Mag. Nat.* **39** : 49, that name being invalid by reason of being a homonym of *Argynnis thore* Hübner var. *borealis* Staudinger, 1861, in Staudinger & Wocke, *Cat. Lep. Europa's* : 9. The type locality of *boreas* Hemming is automatically the same as that of *borealis* Strand, namely "Arktisch. Norwegen."

(E) SUMMARY.

25. The points made in the present paper are:—

(1) The name *Papilio aglaja* Linnaeus, 1758, as applied to the Nymphalid species is invalid, being a homonym of the same name applied by Linnaeus on an earlier page in the same work to a Pierid species (paragraph 2).

(2) The type locality of the Nymphalid *Papilio aglaja* Linnaeus is the "neighbourhood of Uppsala" (paragraph 7).

(3) The oldest name that is nomenclatorially available for the Nymphalid species named *Papilio aglaja* by Linnaeus is *Papilio charlotta* Haworth, 1803, and that name should therefore be used for the collective species (paragraph 15).

(4) *Papilio charlotta* Haworth is not congeneric with *Papilio paphia* Linnaeus, 1758 (type of *Argynnis* Fabricius, 1807) and should be transferred to the genus *Mesoacidalia* Reuss, 1926, of which it is the type (paragraph 18).

(5) The English and Central European subspecies becomes the nominotypical subspecies *Mesoacidalia charlotta charlotta* (Haworth) (type "Bedford"); *Argynnis aglaja* Linnaeus race *emilocuples* Verity, 1919 (type "Berlin") falls as a synonym (paragraph 20).

(6) As *Papilio aglaja* Linnaeus, 1758, is invalid, a new name is required for the South Scandinavian subspecies. The name *Mesoacidalia charlotta linnaei* is proposed as a nom. nov. (paragraph 21).

(7) Both the existing names for the North Scandinavian subspecies—*Papilio emilia* Quenzel, 1802 (type "Lapland") and *Argynnis aglaja* Linnaeus var. *borealis* Strand, 1901 (type "Arktisch. Norwegen")—are invalid homonyms, and a new name is required for this subspecies. The name *Mesoacidalia charlotta boreas* is proposed as a nom. nov. pro *borealis* Strand (paragraph 24).

NEW SPECIES OF *POLYCLADA* (COLEOPTERA, HALTICINAE) FROM AFRICA

By G. E. BRYANT, F.R.E.S.

(Imperial Institute of Entomology.)

KOLBE (1894) realised that *Cladocera* Hope 1840 is not available for the species generally referred to that genus, since it is a homonym of *Cladocera* de Blainville 1837. He re-named the genus *Cladotelia* (1894), considering *Polyclada* (a much older name for the same genus) to be unavailable because of the existence of *Polycladus* Agassiz 1846. *Polyclada*, originally a manuscript name of Chevrolat which first appeared in print in the second edition of Dejean's *Cat. Col.* in 1835, but as a nomen nudum, was validated by Blanchard in 1845 thus having priority over *Polycladus* Agassiz, and being available to take the place of *Cladocera* Hope.

There has been confusion between this genus and *Diamphidia* Gerstaecker 1885. Achard, in 1922, *Fragments Entomologiques* : 4, has separated the species in these genera, on the shape and form, which is broad and rounded in *Diamphidia*, and oblong and more parallel and in most cases the antennae flabellate or pectinate in *Polyclada*. These form two very distinct genera, and I now describe six new species of *Polyclada*. All the types of the new species are in the British Museum (Natural History). *D. nigro-ornata* Stål is of great interest, on account of its use by the natives for making poisoned arrows, and a good deal has been written on the subject by Kolbe, 1894, *Stettin. ent. Ztg* 1894 : 79-86; Fairmaire, 1893, *Bull. Soc. ent. Fr.* 1893 : cccxlii; and Maulik, 1931, *Proc. zool. Soc. Lond.* 1931 : 127-131.

Several names have to be sunk, and *P. fulvipennis* Jacoby transferred to the genus *Blepharida*.

D. uniformis Jacoby is undoubtedly only a small specimen of *D. femoralis* Gerstaecker, which varies in size from 7 to 12 mm. As there is no up-to-date catalogue of the HALTICINAE, I append a list of the species of *Diamphidia* and *Polyclada*, with references.

Diamphidia Gerstaecker 1855.

Diamphidia nigro-ornata Stål, 1858, *Öfvers. Vet. Akad. Forh.* 15 : 250; Natal.

= *lesnei* Achard, 1922, *Fragm. ent.* : 6; Mozambique.

= *locusta* Fairmaire, 1893, *Bull. Soc. ent. Fr.* 1893 : cccxlvii; W. Africa.

= *simplex* Peringuey, 1892, *Trans. S. Afr. phil. Soc.* 6 (2) : 88; S.W. Africa.

= *nigrovittata* Maulik, 1921, *Proc. zool. Soc. Lond.* 1921 : 127; N'gamiland.

D. angolensis Jacoby, *Proc. zool. Soc. Lond.* 1882 : 55; Angola.

= *spectabilis* Peringuey, 1892, *Trans. phil. Soc. S. Afr.* 6 (2) : 87 :—Jacoby, 1903, *Stettin. ent. Ztg* 1903 : 308.

D. femoralis Gerstaecker, 1855, *Monatsb. Berlin Acad. Wiss.* 1855 : 638; Mozambique.

var. *rufescens* Achard, 1921, *Bull. Soc. ent. Fr.* 1921 : 188.

= *uniformis* Jacoby, 1903, *Stettin. ent. Ztg* 1903 : 307; C. Africa.

D. flaviceps Allard, 1887, *Bull. Soc. ent. Fr.* (6) 7 : cc; Zanzibar.

= *nigripennis* Jacoby, 1888, *Trans. ent. Soc. Lond.* 1888 : 197, pl. VII, fig. 2; C. Africa.

- D. limbata* Allard, 1887, *Bull. Soc. ent. Fr.* (6) 7 : cc; Zanzibar.
 = *zanzibarica* Jacoby, 1888, *Trans. ent. Soc. Lond.* 1888 : 198; Zanzibar.
D. concinna Weise, 1906, *Deuts. ent. Z.* 1906 : 56; E. Africa.
D. curtula Achard, 1922, *Fragm. ent.* : 5; Mozambique.
D. jacobyi Gestro, 1895, *Ann. Mus. Civ. Stor. nat. Genova* 35 : 455; Gallaland.
D. nigrifrons Allard, 1887, *Bull. Soc. ent. Fr.* (6) 7 : cc; Zanzibar.
D. robusta Allard, 1887, *Bull. Soc. ent. Fr.* (6) 7 : cc; Zanzibar.
D. semiopaca Achard, 1922, *Fragm. ent.* : 7; Zanzibar.
D. vittatipennis Baly, 1865, *Ann. Mag. nat. Hist.* (3) 16 : 402; Damara.

Polyclada Blanchard 1845.

- P. bedeli* Achard, 1922, *Fragm. ent.* : 4; Djibouti.
P. benti Gahan, 1895, *J. Linn. Soc. Zool.* 25 : 291; Arabia.
P. bohemanni Baly, 1861, *J. Ent.* 1 : 198; Mozambique.
P. compacta Fairmaire, 1887, *Ann. Soc. ent. Fr.* (6) 7 : 361; E. Africa.
P. coriacea Achard, 1922, *Fragm. ent.* : 4; E. Africa.
P. flavipennis sp. n.; Kenya.
P. flexuosa Baly, 1865, *Ann. Mag. nat. Hist.* (3) 16 : 403; S. Africa.
P. kenyensis sp. n.; Kenya.
P. maculicollis sp. n.; Tanganyika.
P. maculipennis sp. n.; Cameroons.
P. ornata Baly, 1861, *J. Ent.* 1 : 199, t. 12, fig. 3; S. Africa.
P. ornatipennis sp. n.; Tanganyika.
P. pectinicornis Olivier, 1791, *Encycl. Méth.* 6 : 31; Senegal.
P. smythi sp. n.; Kenya.
P. variegata Weise, 1900, *Deuts. ent. Z.* 1900 : 458; Mombasa.

HALTICINAE.

Polyclada maculicollis sp. n.

Oblong, convex, pale flavous, front of the head, antennae and legs black, prothorax with five black maculae, elytra pale flavous with three irregular transverse fulvous bands. L. 9 mm.

Head with the vertex and clypeus flavous, a transverse black patch between the base of the antennae and a few strong punctures. Antennae black, extending to the middle of the elytra, the eight terminal segments slightly pectinate, the first segment dilated at the apex, as long as the second and third together, the fourth twice as long as the second. Prothorax pale flavous, with five black maculae, the three median maculae smaller than the two near the posterior angles, strongly transverse, the sides slightly narrowed in front, widest at the base, the surface with fine scattered punctures. Scutellum black, impunctate. Elytra oblong, rounded at the apex, pale flavous, with three irregular transverse bands, one near the base, the second just behind the middle, and the third near the apex, finely and closely punctured. Legs black, the femora tinged with fulvous, the episterna fuscous, the ventral segments of the abdomen two to four about equal.

TANGANYIKA TERRITORY: Mshughaa, xii.1935-i.1936 (*E. Burtt*); 6 specimens.

Allied to *P. ornata* Baly, but differs in its paler colour and the narrower and more irregular transverse bands on the elytra.

***Polyclada ornatipennis* sp. n.**

Oblong, pale flavous, antennae black, prothorax with an irregular black pattern or five black maculae, elytra with three broad irregular fulvous transverse bands, legs with the femora fulvous, tibiae and tarsi black. L. 12 mm.

Head flavous, a short longitudinal black patch between the base of the antennae, basal portion and the mandibles black, rugosely punctured. Antennae extending slightly beyond the middle of the elytra, black, the three basal segments simple, the remainder strongly pectinate, the basal segment slightly longer than the second and third together. Prothorax transverse, the sides straight, slightly contracted in front, pale flavous, an irregular black pattern forming a central "V" and two side spots or with five black maculae, the three median ones rounded, the lateral ones irregularly oval. Scutellum fulvous, finely punctured. Elytra oblong, the sides almost parallel, and rounded at the apex, finely and closely punctured, pale flavous, with three basal irregular transverse bands, the basal one in the form of a cross, expanding at the side margins, fulvous narrowly edged with black, the second transverse band behind the middle, broadly fulvous edged with black, the upper margin more waved than the apical lower, the apical transverse band fulvous edged with black not touching the apex, but forming two rounded flavous spots at the apex. Legs: all the femora fulvous, the tibiae and tarsi black. Underside fulvous except the fuscous prosternum and episterna, the ventral segments of the abdomen clothed with very short ashy pubescence, and very finely punctured.

UGANDA: 93-73, presented by F. D. Lugard; TANGANYIKA TERRITORY (*W. H. Polls*), British Museum 1928-498.

Allied to *P. ornata* Baly; differs chiefly in colour and in the form of the transverse bands in the elytra.

***Polyclada smythi* sp. n.**

Oblong, convex, flavous, the head with a median black macula and the basal portion black, the prothorax with fine black maculae, elytra with three transverse black maculiform striae, antennae and legs with the tibiae black, the femora with the basal two-thirds and tarsi fulvous. L. 10 mm.

Head flavous, a short median longitudinal black macula between the insertion of the antennae, the basal portion behind the eyes black, the antennae extending slightly beyond the middle of the elytra, black, each segment at the base tinged with fulvous, the first segment about as long as the second and third together, the fourth to the apical segment strongly flabellate. Prothorax transverse, flavous, with fine black maculae, the three median forming a "V" and a large black macula on each side near the base, the basal margin narrowly black, not extending to the sides, the disc very finely punctured. Scutellum black, triangular, nitid. Elytra pale flavous, a small black spot at the shoulder, three black transverse maculiform striae, one near the base, a second just behind the middle, the third near the apex and forming a black ring, the apical margin and suture narrowly black, finely and closely punctured. Legs with the tibiae black, the upper margin of the femora black, with two-thirds and the tarsi fulvous. Underside fulvous, the episterna black, finely pubescent, the first ventral segment of the abdomen longer than the second, the second to the fourth short and about equal, the fifth longer.

KENYA COLONY: Watita Hills, Kedai, vi-viii.1912 (*C. Montague Smyth*).

Allied to *P. bohemanii* Baly, but differs in the position of the transverse bands, the apical band forming a complete ring at the apex, instead of a black spot near the apical margin.

***Polyclada maculipennis* sp. n.**

Oblong, convex, pale flavous, prothorax with five black maculae, elytra with seven black maculae on each, antennae and underside black, legs fulvous with the base of the tibiae black. L. 7 mm.

Head flavous, impunctate, transversely impressed between the eyes, the clypeus flavous, palpi black. Antennae extending well beyond the middle of the elytra, black, the seven basal segments having the apical portion tinged with fulvous, the three basal segments more nitid and less pubescent than the terminal segments, the first segment equal to the second and third together, the fourth slightly longer than the third, the remainder all about equal. Prothorax transverse, pale flavous, irregularly and not closely punctured, the vertex with five small black maculae, three basal, the median one the smallest. Scutellum black, triangular, impunctate. Elytra oblong, rounded at the apex, finely and irregularly punctured, each elytron with eleven small black maculae, one at the shoulder, two in line below the base, four in line at the middle, three near the apex and one at the apex not touching the margin. Legs fulvous, the tibiae with the basal portion black. Underside black, clothed with scattered grey pubescence, the apical ventral segment of the abdomen the longest and irregularly punctured.

CAMEROONS: Conradt Expedition, 3 specimens.

Allied to *P. bohemanni* Baly, but differs in its small size and in the position of the black maculae, which are in line, and not irregular, and form three transverse rows instead of two.

***Cladotelia kenyensis* sp. n.**

Flavous with fulvous markings on the prothorax and elytra, antennae with the three basal segments fulvous, the terminal segments black, legs entirely fulvous. L. 9 mm.

Head flavous, a fulvous spot between the eyes and two on the basal part behind the eyes, finely punctured, two longitudinal impressions between the base of the antennae not extending to the basal margin, the mandibles tipped with black. Antennae extending slightly beyond the middle of the elytra, the three basal segments fulvous, the first about equal to the second and third together, the fourth to the eleventh black, and slightly pectinate. Prothorax very transverse, flavous with fulvous markings, a central "V"-shaped fulvous patch edged with black, a large fulvous patch edged with black near the posterior angles, and a small black spot near the anterior angles, very finely and irregularly punctured. Scutellum flavous, triangular, impunctate. Elytra oblong, rounded at the apex, finely and closely punctured, four fulvous oblong patches near the base edged with black, a small black spot near the side margin below the shoulder, and five oblong transverse irregular patches behind the middle fulvous edged with black, and three near the apex, the middle one very small. Legs fulvous, clothed with fine short pubescence, the posterior femora dilated, the anterior tarsi with the basal segment dilated. Underside flavous, clothed with short fine pubescence, the ventral segments two to four short and about equal.

KENYA COLONY: Watita Hill, Kedai (*C. Montague Smyth*), 1 ♂. KENYA COLONY: Lake Jipe (*R. Harger*), v.1921, 1 ♂.

Allied to *P. pectinicornis* Olivier, but differs in the position of the transverse patches on the elytra, the basal ones nearer the base and the one behind the middle nearer the apex.

***Polyclada flavipennis* sp. n.**

Oblong, flavous, the prothorax with seven black maculae, the eight apical segments of the antennae, tibiae and tarsi black. L. 9 mm.

Head flavous, a few strong punctures between the base of the antennae, two fuscous impunctate patches behind the insertion of the antennae, a short median longitudinal patch at the vertex not extending to the base, the mandibles flavous, the apical portion black. Antennae extending slightly beyond the middle of the elytra, the three basal segments flavous, the remainder black, with the apical portion fulvous, the fourth segment nearly twice as long as the third, the second shorter than the first and third, the fifth slightly shorter than the fourth, the remainder each about equal to the fifth, the apical segment acuminate. Prothorax transverse, flavous, with seven black maculae, three median forming a "V" shape, a large one near the posterior angles and a small one near the centre of the side margin, the surface finely but not closely punctured, the side margins slightly rounded, the anterior angles slightly produced, the posterior angles rounded. Scutellum flavous, impunctate, triangular. Elytra flavous, oblong, rounded at the apex, strongly but not closely punctured, much stronger than on the prothorax. Legs black, except the basal two-thirds of the femora fulvous, clothed with fine ashy pubescence. Underside flavous, the ventral segments of the abdomen, two to four about equal, the fifth twice as long as the fourth and strongly notched in the ♂.

KENYA COLONY: Lulangura, 9.xii.1917 (*G. H. Carpenter*), 1 ♂ British Museum; KENYA COLONY: Lulangura, Coryndon Memorial Museum 1 ♂.

Allied to *P. pectinicornis* Olivier, but a narrower species, with the sides of the elytra straighter and entirely flavous, and the antennae not flabellate.

A NEW SPECIES OF *AÈDES* (DIPT., CULICIDAE) FROM ERITREA

By D. J. LEWIS, M.A., F.R.E.S.

(*Entomologist, Sudan Medical Service.*)

Aëdes (*Aëdimorphus*) *eritreae* sp. n.

♀. *Head* with decumbent scales of vertex all narrow, pale except for indistinct patch of brown scales in front. Proboscis usually black above and pale below except near tip. Palps black. *Thorax*: integument of mesonotum dark brown, clothed with narrow scales, some yellow and some copper-coloured; all scutellar scales narrow, more so in centre than on lateral lobes. A few broad creamy scales on paratergite, sub-spiracular scales broad, post-spiracular scales usually broad, but occasionally narrow and intermediate scales are present; *apn* and *ppn* with narrow pale scales; no pre-alar scales. *Legs*: hind femur with dark dorsal stripe occupying almost whole of anterior surface on about $\frac{1}{10}$ of length near tip, pale knee spot present. Conspicuous pale spot at tip of hind tibia. Tarsi dark, hind claws simple. *Abdomen*: tergites with basal pale bands, these widened in middle, lateral pale spots creamy.

♂. *Head* with decumbent scales of vertex all narrow and pale, proboscis dark above and pale beneath. Palpi exceeding proboscis by length of terminal segment. *Thorax* with scales of mesonotum, scutellum and paratergite, and sub-spiracular scales, as in ♀, post-spiracular scales broad; *apn* and *ppn* with most scales narrow, a few broad ones on lower part. *Legs*: marking of hind femur as in ♀ except that pale knee spot is represented only by a single row of scales; tarsi dark. *Abdomen*: tergites as in ♀, sternites with dark apical lateral patches. *Terminalia*: style (fig. 1) with greatly expanded distal part bearing a well-developed horn, 3-5 spines on terminal margin and a stronger spine adjacent to which

is a pubescent tuft like that of *A. abnormalis*. The outer one of the 3-5 spines is small and pointed and is separated from the horn by a tooth-shaped projection of the style; the remainder have rounded ends but are not spatulate. Lower part of expanded end of style bare. Coxite broad in middle.

Wing-length: 3.8-4.3 mm.

Larva and pupa: unknown.

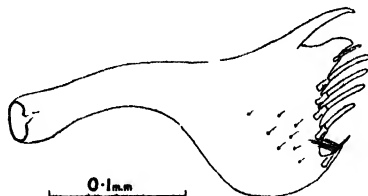


FIG. 1.—*Aedes eritreae* sp. n., style of male.

ERITREA: Acchele Guzai, Debre Axum (near pool 20.3 km. from Saganeiti along Dessie road), c. 6500 ft., 11 ♀ and 4 ♂, 27.iv.42 (including types) and 30.iv.42; females biting at mid-day, males on rocks. The types will be sent to the British Museum (Natural History).

The species is allied to *A. abnormalis* Theobald, 1910, from which it differs principally in having narrow scales on the vertex and a knee spot on the hind femur of the ♀, and in the form of the ♂ style. In the key given by Edwards (1941, *Mosquitoes of the Ethiopian Region* 3: 159) it would run to couplet 34. The following sentence would indicate the species: "Head with decumbent scales in ♀ almost all pale and in ♂ all pale: abdominal tergites with complete pale bands."

NOTES ON THE GENUS *PSEUDOLASIUS* EMERY WITH THE DESCRIPTION OF *PSEUDOLASIUS KARAWAJEWI* SP. N. (HYM., FORMICIDAE)

By Horace DONISTHORPE, F.Z.S., F.R.E.S.

Pseudolasius karawajewi sp. n.

♀. Yellow, mandibles reddish-yellow, teeth of mandibles and eyes black, clothed with yellow outstanding hairs, some of which spring from small raised points, and sparse fine pubescence. Practically impunctate, more or less smooth and shining. Head subquadrate, slightly broader than long, broadest behind, sides of head slightly rounded, posterior angles distinct, posterior border almost straight; mandibles long, powerful, marked with faintly raised longitudinal ridges and shallow obscure punctures, masticatory border armed with 5 sharp teeth, the 3rd being the smallest; clypeus transverse, narrowly margined, very convex on disc with no sign of a keel or carina, anterior border almost straight, obliquely cut off on each side, anterior angles distinct, posterior border sinuate in middle, clypeal and antennal foveae not confluent; frontal area ill defined; frontal carinae short, almost straight and parallel, a short sharp distinct longitudinal raised ridge or carina is present in centre

of front, between the frontal carinae; *eyes* moderate, round, situated a little behind centre of head; *antennae* long, 12-jointed, *scape* extending beyond posterior border of head by more than half its length, *funiculus* gradually thickened to apex, all the joints longer than broad, first joint shorter than second, last joint as long as the two preceding taken together; *maxillary palpi* 3-jointed; *labial palpi* 4-jointed. *Thorax* longer than broad, broadest a little behind centre of pronotum, narrower than head; *pronotum* transverse, convex, sides and anterior border rounded and margined; *mesonotum* oval, convex, slightly narrowed behind, nearly as long as pronotum; *metanotum* narrow, transverse, *spiracles* situated on each side of disc; *epinotum* very convex, broader than mesonotum, epinotal angle gradually rounded, declivity longer than dorsal surface, *spiracles* large, round; *scale of petiole* thick, upper surface narrow, slightly excised in middle, *spiracles* small, round, situated at the sides a little below upper surface. *Gaster* short, oval, convex. *Legs* long, *claws* long and narrow.

Long. 5.5-6.5 mm.

♂. Dirty light brownish-yellow, posterior part of head darker, mandibles, antennae and legs light yellow. Clothed with sparse outstanding yellow hairs which are longer and more numerous on the gaster, sparsely pubescent, and very finely shagreened.

Head triangular, broadest behind, posterior angles rounded; *mandibles* long, masticatory border unarmed, curved and projecting before the long sharp apical tooth, outer border rounded; *clypeus* transverse, convex, anterior border straight in centre, obliquely cut off at sides; *frontal area* obsolete; *front* with a raised longitudinal carina or ridge as in the ♀; *eyes* very large, convex, round, projecting, situated at sides of head; *ocelli* very large, situated on upper surface at back of head; *antennae* long, 13-jointed, *scape*, when extended back, reaching centre of mesonotum; *funiculus* nearly double as long as scape, all the joints longer than broad, 1st joint shorter than second, last joint equal to the two preceding taken together; *maxillary palpi* 3-jointed; *labial palpi* 4-jointed. *Thorax* longer than broad, narrowed to base, convex, anterior angles rounded, broadest before insertion of fore-wings, not broader than head including eyes; *mesonotum* large, convex; no *mayran* furrows present; *praescutellum* very narrow in centre; *scutellum* transverse, very convex; *metanotum* narrow, transverse; *sutures* between mesonotum and metanotum, and metanotum and epinotum deep; *epinotum* evenly rounded without angle between dorsal surface and declivity.

Scale of petiole thick, dorsal surface narrow, excised in middle and with blunt but distinct angles at sides; *gaster* oval, narrowest at apex; *no cerci* present; *genitalia* exerted, *stipes* long, oval, flattened on each side, longer than volsellae and sagittae, fringed with long hairs, *laciniae* and *volsellae* present; edges of *sagittae* not serrate. *Legs* long, with long curved *claws*. *Wings* infuscate and pubescent, *veins* and *pterostigma* light brown, *no discoidal cell*, one long *cubital cell*, and closed *radial cell* present.

Long. 5.5 mm.

N. DUTCH NEW GUINEA: Waigeu, Camp Nok (Miss L. E. Cheesman), 2500 ft., March, April and May, 1938; 18 workers by "casual collecting."

N. DUTCH NEW GUINEA: Waigeu Island (Miss L. E. Cheesman), 2500 ft., May, 1938, 1 male.

Type (♀), and ♂ type in British Museum (Natural History).

This species comes nearest to *P. carinatus* Karawajew from Aru. The latter species has a distinct keel or carina on the clypeus, nor is a carina on the front mentioned in the description, the eyes are slightly more forward, and the teeth of the mandibles are thicker and blunter; etc. It is also not quite so long. The male differs from the male of *breviceps* in not having the masticatory border of the mandibles armed with teeth; the head is not quite so long and a little less narrow; the thorax and gaster are slightly stouter; the funiculus is slightly shorter; the hairs on the stipites are slightly shorter and

less numerous, and the external and internal paramera are slightly shorter. The colour is a little darker.

Emery (1925) gave the distribution of *Pseudolasius* as follows:—Ceylon, Indochina, Malaysia to New Guinea, Australia, Tropical Africa. Wheeler (1915) described a species from the Baltic Amber. Emery (1887) erected the genus *Pseudolasius* for the reception of three species—*Formica familiaris* Smith (1860 : 68 nec p. 96), *P. pheidolinus* Emery (1887), and *P. breviceps* Emery (1887). He gave a few rather vague characters which are mostly in common with the genus *Lasius* Fabricius. He did not cite the type, but this was designated by Bingham (1903) as *Formica familiaris* Smith. In 1925 he characterised the genus more fully. Some of these characters are incorrect, and others require modification, as exhibited in his own species *breviceps*. They are:—“♀. Eyes small, very small or nearly absent, placed on the dorsal face of the head in front of the middle.” In *breviceps*, *carinatus* and *karawajewi*, and also in *familiaris*, they can hardly be called small in the large workers. Also in the two last-mentioned species (and also in Wheeler's *P. boreus* from the Baltic Amber) they are not placed in front of the middle of head. “Maxillary and labial palpi 3-jointed.” In *breviceps* ♀, ♀, and ♂ the maxillary palpi are 3-jointed, but the labial palpi are 4-jointed. In *karawajewi* ♀ and ♂, it is the same; and in the ♀ and ♂ in *binghami* Emery. This is quite certain from dissections by myself, and slides kindly made for me by Drs. Hinton and van Emden, and Mr. Nixon. I quite expect that this will prove to be the case in all the species of the genus, or at any rate in the larger species. “Scape not reaching posterior border of head, or extending very little beyond it.” In *carinatus* and *karawajewi* it extends considerably beyond the posterior border of the head, as is also the case in the smaller ♀ of *breviceps*. “♂. In the small species there is only the apical tooth of the mandibles present.” This is the case with *karawajewi*, which is quite a large species.

“Palpi as in ♀ (i.e. 3-jointed)”; but as I have shown the labial palpi are 4-jointed in the ♂ of *karawajewi* and *breviceps*. The late Russian myrmecologist, Karawajew (1929) redescribed *breviceps* Emery, *mayri* Emery and *pheidolinus* Emery. Of the first-mentioned species he figured the heads of 3 forms of the worker, the female, and 2 forms of male. He showed the first tooth of the mandibles to be bimaconate in the ♀ (which is the case with a specimen taken by Miss Cheesman at Waigau. She also took a small species, *P. amblyops* Forel, there; but none on Japan Isl.). Karawajew also described 3 new species, including *carinatus* referred to in this paper; I have named the new species in his honour.

Emery (1911) pointed out that the *familiaris* of Bingham (1903) and Forel (1894) is not that of Smith, and he proposed *P. binghami* nom. n.; he also noted that *familiaris* Mayr (1865) and Emery (1887) are not that of Smith, and proposed *P. mayri* nom. n.

Pseudolasius familiaris Smith.

Formica familiaris Smith, 1860, J. Proc. Linn. Soc. Lond. Zool. 5 : 68.

Professor G. D. Hale Carpenter having kindly lent me Smith's type, I decided to redescribe it. I expect that the maxillary palpi are really 3-jointed and the labial palpi 4-jointed, for though one can see only 2 and 3 joints respectively, it is probable that the first joint in each case is hidden, and of course it would not be right to dissect this venerable specimen. As to the number of teeth to the mandibles, it is undoubtedly eight. Emery (1911) said seven,

possibly eight, and figured a mandible he said Professor Poulton had drawn for him from the type. The right mandible has eight clear teeth, and in the left the first tooth is partly joined to the second.

I have compared the type with a ♀ from Sikhim named *familiaris* by Bingham, and the two insects are quite distinct. Emery's name—*binghami*—therefore will have to stand for the Indian insect.

♀. Reddish-yellow, gaster darker, extreme apex of segments pale yellow, teeth of mandibles black. Clothed with sparse outstanding yellow hairs, and fine silky yellow pubescence.

Head subquadrate, narrower in front than behind, broadest at base, posterior angles rounded, posterior border slightly emarginate; *mandibles* long, shining, sparsely and shallowly punctate, masticatory border armed with 8 teeth, the first being the smallest, the fifth and seventh longer than the sixth, five to eight are sharply pointed, the apical (eighth) tooth being the longest; *maxillary palpi* 3-jointed?; *labial palpi* 4-jointed?; *clypeus* large, transverse, convex on disc, anterior border slightly excised in middle, sinuate on each side; *frontal area* not defined, *frontal carinae* rather widely separate, strongly sinuate behind lobe; *clypeal foveae* not confluent with *antennal foveae*; *eyes* large, round, prominent, situated a little behind centre of head; *ocelli* large, prominent; *antennae* 12-jointed, *scape* extending beyond posterior border of head by about $\frac{1}{2}$ of its length, all joints of *funiculi* longer than broad, first joint longer than second, joints 2-9 subequal, last joint scarcely as long as the two preceding taken together. *Thorax* oval, broadest just before insertion of fore-wing, anterior angles rounded; *pronotum* transverse, widely embracing the mesonotum, anterior border projecting to form a short neck, narrowly margined; *mesonotum* large, convex anteriorly, rather flat on disc, *suture* before praescutellum rather deep; *praescutellum* very narrow in centre; *scutellum* transverse, oval, rather flat; *metanotum* transverse, narrow, slightly raised; *sutures* between scutellum and metanotum, and metanotum and epinotum, rather deep; *epinotum* transverse, rather flat, no angle between dorsal surface and declivity. *Scale of petiole* not thick, about as broad as high, upper surface emarginate, slightly inclined forward. *Gaster* not very voluminous, long, oval, broader in front than behind, slightly overhanging scale. *Legs* rather short. *Wings* yellowish, *veins* and *pterostigma* yellow, no discoidal cell, one cubital and closed radial cell as in *Camponotus*.

Long. 8 mm.

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BOOK NOTICE.

General Entomology. By S. W. FROST. pp. x + 524, 406 figs., front. 8vo.
New York and London (McGraw-Hill), 1942, 28s.

The author of this book is Professor of Economic Entomology at Pennsylvania State College, and his work is intended as a textbook "for elementary college entomology and . . . as an introduction for more advanced insect studies."

In view of the many books dealing with identification, classification, physiology and morphology, little stress is laid on these subjects but more attention is paid to the immature forms of insects and to the details of their habits. The orders of insects are dealt with in some detail as it is held that a fundamental knowledge of the major groups is essential to any introduction to entomology.

The twenty-three chapters of the book deal with the position of insects in the animal world; origin and distribution of insects; abundance, size, and reproductive capacity of insects; beneficial and injurious insects; orders of insects; metamorphosis; immature insects; insect morphology; colour; sonification [the production of sound]; insect behaviour; insect associations including social insects; solitary insects; scavengers, predators, and parasites; association of plants and insects; leaf-mining insects; leaf-rolling insects; gall insects; boring insects; subterranean insects; aquatic insects; case-making insects; cessation of activity; and an appendix giving field keys to immature forms including lepidopterous and coleopterous larvae, and some tables showing the several schemes of classification proposed. A 30-page index, in double column, is provided and there is a bibliography to each chapter.

THE BEETLE FAMILY RHYSODIDAE, WITH SOME NEW SPECIES AND A KEY TO THOSE AT PRESENT KNOWN

By Gilbert J. ARROW, F.Z.S., F.R.E.S.

(*British Museum (Natural History).*)

MORE than 40 years have passed since, in 1901, *Ann. Mag. nat. Hist.* (7) 7: 83, I described a number of Oriental species of the genus *Rhysodes*. Two years later, in 1903, *Rev. d'Ent., Caen*, 22: 85, appeared Grouvelle's important "Synopsis des Rhysodides," which, with the accompanying figure and description of the larva by de Peyerimhoff, brought together everything known concerning this remarkable family of beetles. Grouvelle included in his monograph a key to the species, amounting to 99, omitting only 3 which he did not attempt to place. Unfortunately the rather over-bold attempt to include species which he had not seen led him to misplace or misidentify a few of them, while through insufficient care in the correction of his proofs certain other errors were overlooked which somewhat reduce the usefulness of this part of the work. Since the date of Grouvelle's publication about a dozen species have been added to the list, 5 of them found in Australia and described by Arthur Lea and 7, chiefly from India and Burma, described by Grouvelle himself. Several more are now known to me and, since their identification will be facilitated by their inclusion in a tabular arrangement, it has seemed desirable to reproduce Grouvelle's key in a more compact form, including in it the additional species at present known to me and locating more correctly those found to have been misplaced. The characters used are those selected by him, with the omission of one or two which I have found illusory. Thus, while I am responsible for placing all the forms known to me, those seen by him but not by me remain as placed by him. It has been necessary to omit 13 species, of which a list is given after the key.

While recognising only two genera, *Rhysodes* and *Clinidium*, Grouvelle employed other names similar in form as subgeneric, and in doing so has not escaped some measure of the confusion which seems sooner or later almost inevitably to result from that practice. Subdivisions of genera can be indicated in various ways not liable to any such disadvantage and, in adopting Grouvelle's groups, I have substituted for these names terms with a plural ending in more strict accordance with the Linnean method. The use of two different names for the same insect is thus not possible and no priority problems arise. If, in the future, a more convenient method of subdivision should be devised these terms can be discarded; but subgeneric names, often based on a very few species, remain as stumbling-blocks although the features supposed to be distinctive may prove on completer knowledge to be illusory.

The RHYSODIDAE constitute one of the most peculiar and isolated families of beetles. They are also undoubtedly a very ancient group, for both the component genera are found throughout the greater part of the world, although, in *Clinidium* at least, the means of dispersal seem to be severely reduced. The species are wingless and their eyes are often so diminished that many must be almost, if not quite, blind. The most obvious characteristic of the family is the corrugation of the upper surface by deep grooves. The occurrence at various points in

these grooves of small orifices appears not to have attracted attention. Such orifices, as elsewhere, are usually surrounded by fine hairs. They are generally to be found near the base of the lateral grooves of the pronotum, as in *ENDOMYCHIDAE* and other beetles of various groups, another often appears at the base of the median groove and yet another near its anterior end. Another may occur at the back of the head and in *Clinidium* there is probably one upon the mesonotum. The pits are always choked with a yellowish coagulated substance, perhaps of an adhesive character, since fragments of the soft woody substance in which the insects live are often found in the grooves and are only removed with a little difficulty. The secretion is no doubt the equivalent of that exuded by some *STAPHYLINIDAE*, *PSELAPHIDAE* and other beetles, which makes them welcome inmates of ants' nests. Association with ants or Termites has not apparently been recorded of any Rhysodid and the secretion may be of an unpleasant, instead of a pleasant, kind and so protective.

The distribution of this little family throughout the world would form a profitable study. Some of the species, such as those of Europe and South Africa, are separated by wide distances from the rest, suggesting the existence, at a remote period of time, of much better means of dispersal than they appear to possess at the present day. The seemingly near relationship, much too great to be explained by mere convergence, between *R. thoreyi* in South Africa and *R. pensus* in New Zealand is not easily explained.

The distinctions between the very closely related and much confused European *R. germari* and North American *R. americanus* and *hamatus* have never been pointed out. Grouvelle attempted to distinguish the males alone but in this he has failed, for all the males have the front femora toothed. The three forms can be recognised, amongst other slight differences, by the rather different conformation of the head in both sexes.

A third genus, *Rhyzodiastes*, not now accepted as distinct from *Clinidium*, was proposed by Fairmaire in 1895. The type-species, *parumcostatus* Fairmaire, was said to inhabit Madagascar, but the features detailed correspond so completely with those of the Brazilian *Clinidium costatum* Guérin that it seems almost certain a specimen of that species was actually described.

The larvae taken at Palembang in Sumatra and described and figured by M. de Peyerimhoff in 1903 were probably those of *Rhyzodes malaicus*, which has been found in some numbers in that locality. The species seems to have been incorrectly identified by Grouvelle, being called by him *philippensis* Chevrolat in his key to the species. *R. philippensis*, as described by Chevrolat, has the 2nd and 4th intervals of the elytra elevated and is thereby relegated to a different part of the key from that in which it was placed. To it probably belong specimens taken in the Philippine Is. by Semper, two of which are now in the British Museum. The head is more (not less) elongate than that of *R. malaicus* and the outer discoidal costae of the pronotum are strongly punctured.

Whether certain described forms indicated by Grouvelle in his list of species as possibly not entitled to separation will eventually have to be removed from the list there is still insufficient means of deciding.

In the following tabulation I have for convenience used the term "interval" for the elytral spaces counted from the suture, without omitting the marginal one, as Grouvelle with more exactitude has done.

The species not seen by myself are indicated by the letter (G).

Key to the genera and subdivisions.

- 1 (8). Eyes lateral, well developed *Rhysodes* Dalman.
- 2 (7). Head deeply grooved above.
- 3 (6). Eyes large, not very prominent.
- 4 (5). Median lobe of the head reaching the neck *Longilobati*.
- 5 (4). Median lobe of the head not reaching the neck *Brevilobati*.
- 6 (3). Eyes small and very prominent *Ocellati* (*R. dohertyi* Grouvelle only).
- 7 (2). Head feebly grooved above *Consolidati*.
- 8 (1). Eyes dorsal, feebly developed or absent *Clinidium* Kirby.
- 9 (10). Lateral grooves of the pronotum abbreviated *Brevisulcati*.
- 10 (9). Lateral grooves of the pronotum complete *Longisulcati*.

Key to the species of *Rhysodes* subdiv. *Longilobati*.

- 1 (4). Lateral grooves of the pronotum short.
- 2 (3). Median groove of the pronotum wide *sulcatus* F.
- 3 (2). Median groove of the pronotum narrow *arcuatus* Chevrolat.
- 4 (1). Lateral grooves of the pronotum long.
- 5 (8). Elytra bearing scattered erect setae.
- 6 (7). Lateral margins of the pronotum conspicuous *luscus* Chevrolat.
- 7 (6). Lateral margins of the pronotum not conspicuous *setosus* Grouvelle (G).
- 8 (5). Elytra without setae.
- 9 (10). 4th and 5th elytral intervals uniting in a posterior carina *frontalis* Grouvelle (G).
- 10 (9). 4th and 5th elytral intervals not uniting in a posterior carina.
- 11 (14). Inner costae of the pronotum not abbreviated anteriorly.
- 12 (13). Elytral punctures as wide as the intervals *parvus* Grouvelle (G).
- 13 (12). Elytral punctures not as wide as the intervals *comes* Lewis.
- 14 (11). Inner costae of the pronotum abbreviated anteriorly.
- 15 (18). Elytra striate.
- 16 (17). Lateral grooves of the pronotum wide *abbreviatus* Lea.
- 17 (16). Lateral grooves of the pronotum not wide *occipitalis* Grouvelle (G).
- 18 (15). Elytra seriate-punctate *cylindricus* sp. n.

Key to the species of *Rhysodes* subdiv. *Brevilobati*.

- 1 (6). Lateral grooves of the pronotum abbreviated.
- 2 (3). Elytra depressed *boysi* Arrow.
- 3 (2). Elytra very convex.
- 4 (5). Lateral foveae of the pronotum containing an elevation; abdomen strongly punctured *niponensis* Lewis.
- 5 (4). Lateral foveae of the pronotum without elevation; abdomen sparsely punctured *peninsularis* sp. n.
- 6 (1). Lateral grooves of the pronotum not abbreviated.
- 7 (20). Posterior cavity of the head small, shutting out the median lobe.
- 8 (15). Median lobe of head dilated.
- 9 (10). Pronotum rugosely punctured *rugosus* Grouvelle.
- 10 (9). Pronotum shining.
- 11 (12). Elytral punctures not as broad as the intervals *strabus* Newman.
- 12 (11). Elytral punctures as broad as the intervals.
- 13 (14). Inner costae of the pronotum much broader than the outer ones *aterrimus* Chevrolat.
- 14 (13). Inner costae of the pronotum not broader than the outer ones *pilosus* Grouvelle.

- 15 (8). Median lobe of head narrow.
- 16 (17). Punctures of the elytra much narrower than the intervals *lederi* Lewis.
- 17 (16). Punctures of the elytra not much narrower than the intervals.
- 18 (19). Cavity enclosing median lobe of head U-shaped . *subcaviceps* Grouvelle.
- 19 (18). Cavity enclosing median lobe of head V-shaped . *crassiusculus* Lewis.
- 20 (7). Posterior cavity of the head enclosing the end of the median lobe.
- 21 (22). Lateral lobes of the head very broad; posterior pit very small
lineatus Grouvelle.
- 22 (21). Lateral lobes of the head less broad; posterior pit not very small.
- 23 (32). Lateral grooves of the pronotum much wider than the median groove.
- 24 (27). Antennae, tibiae and tarsi short and thick.
- 25 (26). Pronotum hexagonal *hexagonus* Grouvelle (G).
- 26 (25). Pronotum cordiform *carinatus* Grouvelle.
- 27 (24). Antennae, tibiae and tarsi more slender.
- 28 (29). Pronotum much longer than its width . . . *taprobanae* Fairmaire.
- 29 (28). Pronotum not much longer than its width.
- 30 (31). Posterior lobes of the head narrowed behind . . . *nilgiriensis* sp. n.
- 31 (30). Posterior lobes of the head not narrowed behind . *solitarius* sp. n.
- 32 (23). Lateral grooves of the pronotum not much wider than the median groove.
- 33 (42). Alternate intervals of the elytra elevated anteriorly.
- 34 (35). Lateral margins of the pronotum not conspicuous
crenatus Grouvelle (G).
- 35 (34). Lateral margins of the pronotum conspicuous.
- 36 (37). Antennae rather stout *oberthuri* Grouvelle (G).
- 37 (36). Antennae more slender.
- 38 (39). Lateral lobes of the head narrowed behind . . . *sulcicollis* Lewis.
- 39 (38). Lateral lobes of the head not narrowed behind.
- 40 (41). Head broad *borneensis* Grouvelle.
- 41 (40). Head narrow *philippensis* Chevrolat.
- 42 (33). Alternate intervals of the elytra not distinctly elevated.
- 43 (70). Terminal joint of the antenna pointed.
- 44 (45). Lateral lobes of the head separated behind by a rectilinear groove.
elegans (Grouvelle (G)).
- 45 (44). Lateral lobes of the head not separated by a rectilinear groove.
- 46 (49). Punctures of the elytra rather small.
- 47 (48). Head and pronotum very elongate *rostratus* Lewis.
- 48 (47). Head and pronotum not very elongate . . *blackburni* Grouvelle (G).
- 49 (46). Punctures of the elytra rather large.
- 50 (51). Head rugosely punctured *figuratus* Germar.
- 51 (50). Head not rugosely punctured.
- 52 (53). Head rather narrow *grouvellei* Fairmaire.
- 53 (52). Head moderately broad.
- 54 (55). Median lobe of the head not interposed between the lateral lobes
africanus Grouvelle (G).
- 55 (54). Median lobe of the head interposed between the lateral lobes.
- 56 (57). Median lobe oval *planifrons* Fairmaire (G).
- 57 (56). Median lobe not oval, rather narrow.
- 58 (67). Median lobe not interrupted between the antennae.
- 59 (62). Lateral margin of the pronotum shining, not flat.
- 60 (61). Metasternum coarsely punctured *canaliculatus* Castelnau.
- 61 (60). Metasternum smooth *tubericeps* Fairmaire.
- 62 (59). Lateral margin of the pronotum flat, not shining.
- 63 (64). Lateral lobes of the head produced behind . . . *coomani* sp. n.

- Key to the species of *Rhysodes* subdiv. Consolidati.**

Lateral grooves of the pronotum reaching the middle; elytra not distinctly punctured	<i>thoreyi</i> Grouvelle.
Lateral grooves of the pronotum not reaching the middle; elytra distinctly punctured	<i>pensus</i> Broun.

Key to the species of *Clinidium* subdiv. *Brevisulcati*.

- 1 (2). Intervals of the elytra irregular
quadristriatum Chevrolat (G), *maderiense* Chevrolat (G).
- 2 (1). Intervals of the elytra regular.
- 3 (34). Pronotum without a large and deep anterior excavation.
- 4 (5). Lateral foveae of the pronotum almost reaching the front margin
integrum Grouvelle (G).
- 5 (4). Lateral foveae of the pronotum far from the front margin.
- 6 (7). 2nd and 3rd intervals of the elytra united in front
curvicosta Chevrolat (G).
- 7 (6). 2nd and 3rd intervals of the elytra not united in front.
- 8 (11). 2nd and 3rd intervals united behind.
- 9 (10). 1st and 2nd elytral striae not very deep . . . *canaliculatum* Costa.
- 10 (9). 1st and 2nd elytral striae very deep . . . *marginicollae* Reitter.
- 11 (8). 2nd and 3rd intervals not united behind.
- 12 (15). Lateral foveae of the pronotum reaching the middle.
- 13 (14). Pronotum long; lateral foveae extending past the middle
pilosum Grouvelle (G).
- 14 (13). Pronotum shorter; lateral foveae not extending past the middle
oberthuri Grouvelle.
- 15 (12). Lateral foveae of the pronotum not reaching the middle.
- 16 (27). Head strongly dilated behind.
- 17 (22). 3rd and 4th intervals of the elytra not united behind.
- 18 (19). Median lobe of the head not long . . . *veneficum* Lewis.
- 19 (18). Median lobe of the head long.
- 20 (21). Pronotum shorter, not very narrow in front . . . *sculptile* Newman.
- 21 (20). Pronotum long, very narrow in front . . . *calcaratum* Leconte.
- 22 (17). 3rd and 4th intervals of the elytra united behind.
- 23 (26). Median lobe of the head prolonged behind.
- 24 (25). Pronotum with one outer marginal stria . . . *mexicanum* Chevrolat.
- 25 (24). Pronotum with two outer marginal striae . . . *guatemalenum* Sharp.
- 26 (23). Median lobe of the head not prolonged behind . . . *simplex* Chevrolat (G).
- 27 (16). Head little dilated behind.
- 28 (31). Lateral foveae of the pronotum less than one-third of its length.
- 29 (30). Not very slender; 3rd and 4th intervals of the elytra not united
behind . . . *jamaicense* sp. n.
- 30 (29). Very slender; 3rd and 4th intervals of the elytra united behind
planum Chevrolat.
- 31 (28). Lateral foveae of the pronotum more than one-third of its length.
- 32 (33). Very slender; metasternum incompletely sulcate . . . *gouldingi* Kirby.
- 33 (32). Not very slender; metasternum completely sulcate . . . *rojasi* Chevrolat.
- 34 (3). Pronotum with a large deep anterior excavation.
- 35 (36). Lateral foveae lightly impressed at the anterior end . . . *cavicollae* Chevrolat.
- 36 (35). Lateral foveae deeply impressed at the anterior end.
- 37 (40). Lateral foveae less than one-third the length of the pronotum.
- 38 (39). Median groove of the pronotum narrow at the base
foveolatum Grouvelle (G).
- 39 (38). Median groove of the pronotum broader at the base
dubium Grouvelle (G).
- 40 (37). Lateral foveae more than one-third the length of the pronotum.
- 41 (44). 3rd and 4th intervals of the elytra united behind.
- 42 (43). Joints of the antenna loosely connected, spherical . . . *insigne* Grouvelle (G).
- 43 (42). Joints of the antenna closely connected, transverse
mathani Grouvelle (G).
- 44 (41). 3rd and 4th intervals of the elytra not united behind.

- Key to the species of *Clinidium* subdiv. Longisulcati.**

- R. quadriimpressus* Grouvelle (Tanganyika), 1910, *Bull. Soc. ent. Fr.* **1910** : 325.

- R. ichthycephalus* Lea (Queensland), 1904, *Proc. Linn. Soc. N.S.W.* **29** : 79.
R. mirabilis Lea (Queensland), *op. cit.* : 80.
R. trichosternus Lea (Victoria), *op. cit.* : 81.
R. planatus Lea (Victoria), *op. cit.* : 82.
C. humeridens Chevrolat (Cuba), 1873, *Ann. Soc. ent. Fr.* (5) **3** : 215.
C. chevrolati Reitter (Colombia), 1880, *Verh. Nat. Ver. Brunn* **18** : 30.
C. apertum Reitter (Himalayas), *op. cit.* : 29.
C. rimoganense Miwa (Formosa), 1934, *Trans. nat. Hist. Soc. Formosa* **24** : 256.

Rhysodes cylindricus sp. n.

Black, smooth and shining, moderately elongate and cylindrical. Head not longer than it is wide, the median lobe broad and produced beyond the base, the lateral lobes short and very prominent at the sides, emarginate at the inner edge and separated by a deep excavation from the median lobe. Pronotum quadrate, about as long as wide, bearing four broad smooth costae, separated by grooves which are narrow except in front and behind, the inner costae abbreviated in front, the basal foveae very large, the lateral margins rounded in front, almost parallel behind. Elytra rather broad and convex, bearing rows of rather widely separated punctures, the innermost row joined by a slightly impressed stria, the intervals broad and flat, the 5th interval elevated at the extremity and bordering a deep apical excavation. The metasternum is very smooth except at the sides, the abdominal sternites, impressed on each side, each with a row of punctures, except the last which is irregularly punctured. The antennae are moniliform and bear fairly long but not close hairs, joints 2-5 spherical, 6-10 transverse and the last not acuminate.

♂. The hind tibia is a little produced at the end inwardly.

Length 5.5-7 mm.

EASTERN NEW GUINEA : Mt. Tafa, 8500 ft. (*Miss L. E. Cheesman*), Feb., March. Eight specimens were taken.

This appears to be closely related to *R. occipitalis* Grouvelle and, like it, has the median lobe of the head extended far back and overlapping the pronotum, the two inner costae of which are abbreviated in correspondence; but the new form differs conspicuously in being shining black and smooth, the elytra not striate but bearing rows of punctures, neither large nor close together, whilst *R. occipitalis* has broad striae with narrower intervals.

Rhysodes peninsularis sp. n.

Black, smooth, shining, narrow, with moderately long legs and antennae. Head short, broad between the eyes, the median lobe broad in the middle, tapering to a rather sharp point behind and reaching the small circular posterior pit, the lateral lobes broad, not long, rounded behind. Pronotum long and narrow, with the sides gently rounded, the median groove narrow, feebly dilated in front and behind, the lateral foveae not quite reaching the middle of the pronotum, broad and deep behind, without rounded basal elevation. Elytra not very long, narrow and convex, feebly sulcate but with rows of not very large or close punctures, the 2nd row (from suture) terminating in a deep longitudinal excavation behind. Lower surface very smooth, the abdomen bearing a few scattered punctures. Joints 4-10 of the antennae are transverse and the last joint is acuminate.

♂. The front femur bears a strong sharp tooth at its anterior edge and the hind tibia is a little curved and strongly produced inward at its extremity.

Length 5 mm.

MALAY PENINSULA : Tanak Rata, Pahang, 4500 ft. (*H. M. Pendlebury*), May. A single specimen.

Grouvelle has recorded examples of the Japanese *R. niponensis* Lewis, from Java, Borneo and Sumatra, as a variety *longior*, which he describes as more elongate than the typical form. The specimen here described is closely similar to *niponensis* but rather less, instead of more, elongate. It differs also in the smooth abdomen, which bears only very sparse punctures, and the absence of the rounded elevation which occupies the basal part of the thoracic foveae in *niponensis*. Like that species, it is a very smooth, rather narrowly cylindrical insect, with slender legs and tarsi.

***Rhysodes solitarius* sp. n.**

Black, smooth and shining, not very slender. The head is moderately elongate, the lateral lobes large, rounded externally, rather wide apart in front and diverging behind at an obtuse angle. The median lobe is moderately wide, parallel-sided and bluntly pointed behind, where it is embraced by a broad excavation. The pronotum is a little longer than wide, the sides evenly rounded, with flat outer margins and four discoidal costae, of which the two inner ones are broader than the outer, tapering at each end and divided by a very narrow groove, the outer grooves broad. The elytra are distinctly broader than the pronotum, gently rounded at the sides, strongly punctured in deep grooves, with the intervals fairly narrow, the 3rd and 5th elevated in the anterior half, the 4th distinctly abbreviated in front and the 2nd, 3rd and 4th behind. The antennal joints are spherical, except the 1st and last, and the last is not sharply pointed.

♂. The front femur is toothed at the inner edge, the middle tibia is sharply produced inwards at the end and the hind tibia strongly but less sharply.

Length 6 mm.

ANDAMAN IS.

R. solitarius is the second species of *Rhysodes* found to occur in the Andaman Islands, the other being the larger and less shining *R. aterrimus* Chevrolat. It has a close resemblance to *R. nilgiriensis*, from which it is easily distinguished by the lateral lobes of the head being rounded instead of narrowly drawn out behind, by the 3rd and 5th intervals of the elytra being distinctly more elevated in front than the rest and the 4th interval abbreviated in front. This alternation of the costae evidently distinguishes it also from *R. nicobarensis* Grouvelle, which is not known to me. The very narrow median groove and wide lateral grooves of the pronotum also preclude its identification with that species.

A single specimen has been in the British Museum since 1876.

***Rhysodes nilgiriensis* sp. n.**

Black, smooth and shining, very convex above and not very long or narrow. Head long and rather narrow, the lateral lobes not broad, rather widely separated in front, almost meeting behind, where they are rather narrowly produced, diverging at an acute angle; the median lobe narrow, parallel-sided, tapering behind and projecting into the broad posterior pit. Pronotum a little longer than wide, with four smooth rounded subequal costae, the lateral grooves much wider than the median one, the sides gently rounded, converging strongly in front but only slightly behind. Elytra deeply sulcate, the intervals narrowly elevated and very shining, the grooves strongly and deeply punctured, the 2nd, 3rd and 4th intervals abbreviated behind and the 5th extended to the suture but not conspicuously thickened. Antennae short but not thick, joints 2-4 spherical, 5-10 transverse and the last not acuminate.

♂. The hind tibiae are rather broadly dilated internally at the end.

Length 5.5-6 mm.

S. INDIA : Nilgiri Hills (*H. L. Andrewes*). Three examples were found.

Like *R. cheesmanae*, to which it bears considerable resemblance, this is a rather short-bodied form. It may be best recognised by the narrowly backward-produced lateral lobes of the head. It differs from *R. cheesmanae* in its narrower head, the more rounded sides of the pronotum and much more deeply sulcate and punctured elytra. It has a superficial resemblance to *R. malabaricus* Arrow, the only known specimen of which was taken in the same region of India. From this it is easily distinguished by its much narrower head, the backwardly produced lateral lobes, very broad outer discoidal grooves of the short pronotum and the shorter and broader elytra.

***Rhysodes coomani* sp. n.**

Black, smooth and shining, convex, not very elongate. Head rather narrow, with the median lobe sagittiform, contracted in front and pointed behind, the lateral lobes not broad, narrowed and produced behind, gently emarginate at the inner edge, the posterior excavation not wide, parallel-sided. Pronotum not much longer than wide, the sides gently rounded, converging in front and behind, the upper surface bearing four smooth, convex, nearly equal and equidistant costae. The elytra are rather short and broad and bear rows of large, very deep and sometimes partly confluent punctures. Each elytron has a deep longitudinal excavation before the extremity. The metasternum bears only a few large scattered punctures and the 2nd, 3rd, 4th and 5th ventral sternites have each a single row, the last also a deep marginal groove. The antennal joints between the 1st and last are transverse but not very broad.

♂. The femur of the front leg has a sharp tooth upon its anterior edge and the hind tibia is dilated internally at the end.

Length 4.5-5.5 mm.

TONKIN : Hoabinh (*A. de Cooman*).

The six specimens of this species are all males. It closely resembles *R. nilgiriensis*, but the median lobe of the head is differently shaped, the grooves of the pronotum are less unequal and the elytra are not sulcate. It also resembles *R. malaicus* Arrow, but is rather smaller and shorter, the head is relatively longer, the lateral lobes being less rounded and more narrowed and produced behind. The median lobe has an arrow-head shape. The four costae of the pronotum are more equal, parallel and equidistant. The sculpture of the elytra is similar in the two species but the punctures in *R. coomani* are larger and less close and numerous. The abdomen is not closely punctured, as in *R. malaicus*, each sternite, except the first, bearing only a single row of punctures. The distinctive features of the male are similar in the two species but the middle tibia of *R. coomani* is not dilated at the end.

***Rhysodes cheesmanae* sp. n.**

Black and shining, not very elongate, with fairly stout legs and antennae. Head broad behind, a little longer than it is wide, with the median lobe moderately long, rather narrowly oval and blunt behind, the lateral lobes not very wide, their inner margins strongly excised, forming a broad excavation behind the median lobe. Pronotum a little longer than it is wide, the sides gently rounded, not much contracted behind, with three entire dorsal grooves, the median one narrow and the lateral ones broad. Elytra not very long, not distinctly striate, bearing longitudinal lines of close and numerous, not very large punctures, the apical part of each elytron deeply excavated. Metasternum smooth, with a few fine scattered punctures. Ventral sternites with very coarse, partly confluent punctures crossing each

transversely, the 3rd sternite with a deep excavation on each side. Legs and antennae short and stout, the latter with the joints, except the 1st and last, transverse, the last joint not acuminate.

♂. The front femur is bluntly toothed in front and the hind tibia is bluntly dilated at the end.

Length 5.5 mm.

WESTERN NEW GUINEA: Sabron, Cyclops Mts., 930 ft. (Miss L. E. Cheesman), May. The type is unique.

This species rather nearly resembles *R. bucculatus* Arrow, from Sumbawa I., but it is more stoutly built, with the head, prothorax and elytra all shorter, as well as the legs and antennae. The lateral lobes of the head are less broad and enclose a wide excavation, into which the blunt tip of the median lobe projects. The pronotum is only a little longer than it is wide and the elytral punctures are small but rather more numerous and close together than those of *R. bucculatus*.

Clinidium jamaicense sp. n.

Small, black, smooth and shining, the legs and lower surface sometimes deep red, the body narrow but the hinder part not very elongate, the legs and antennae short. Head narrow, the eyes much reduced and very narrow, the lateral lobes elongate-oval and the median lobe forming a broad-based acute-angled triangle reaching as far as the middle of the eyes. Pronotum oval, nearly twice as long as wide, with curvilinear sides, narrow median groove and very short lateral foveae. Elytra rather short, distinctly wider than the pronotum, narrowly sulcate, with convex costae, the 3rd and 4th (from the suture) not united behind and the 4th defined externally only by a row of punctures. Abdominal sternites deeply grooved at the sides. Antennae closely jointed but not thick.

♂. Middle and hind tibiae dilated at the end, where they form strong tridentate processes.

Length 5-6 mm.

JAMAICA: Newcastle (Dr. M. Cameron), Aug. Four specimens found in rotting bark.

This species is nearly related to *C. guildingi* Kirby, from St. Vincent, but shows numerous small differences. It is of almost the same size and shape, small and narrow, but the pronotum has a narrower median groove and shorter lateral foveae, the elytral grooves are narrower and the costae broader, the 3rd and 4th not coalescing behind as in *C. guildingi*, and the terminal excavation is rather less deep. The antennae are short but the joints are a little less broad than in the allied form. The femora and the four posterior tibiae have only traces of the white longitudinal lines so conspicuous in *C. guildingi*. *C. humeridens* Chevrolat, from Cuba, appears to resemble the Jamaican species but its elytra are said to have a lateral stria interrupted near the middle.

The type of *C. guildingi* Kirby is in the British Museum, as well as many other specimens of the species, collected in the island of St. Vincent by H. H. Smith. Chevrolat pronounced his *C. planum*, from Guadeloupe, identical with *C. guildingi* but a specimen from Guadeloupe in the British Museum shows that this is not so. It is extremely close to the Jamaican form here described but the median lobe of the head is narrower and the elytra relatively longer and narrower, with the 3rd and 4th intervals, which are completely separated in *C. jamaicense*, united behind, the 2nd interval broader and flatter and the 4th limited externally by a deep groove. The abdominal sternites are deeply grooved, the grooves of the 2nd and 3rd segments extending from side to side and that upon the 3rd arched and approaching the anterior edge of the segment.

In *C. jamaicense* the abdomen is quite smooth in the middle and the grooves are straight and confined to the sides.

***Clinidium myopleum* sp. n.**

Black, very smooth and shining, moderately elongate, with rather stout antennae and legs, the former with joints 2-10 transverse. Lateral lobes of the head oval, rather broad, median lobe triangular, narrowly produced between the lateral lobes and sharply pointed. Pronotum nearly twice as long as it is broad, with the sides almost straight and parallel, scarcely tapering in front, slightly contracted behind, excavated at the front angles and bearing three narrow entire dorsal grooves, the inner interspaces twice as wide as the outer, the median groove a little dilated in front and behind and the lateral grooves each ending in a deep pit at the base. Elytra each with three narrow deep striae, containing scanty and inconspicuous punctures, intervals 1 and 2 from the suture gently convex, 3 subcarinate, incurved at the apex, where there is a deep and wide cavity. Lower surface very smooth, each abdominal sternite with a deep straight lateral groove just behind the front margin, the 4th sternite with a deep lateral cavity and the last with a posterior groove.

♂. The front femur is toothed at its anterior edge and the middle and hind tibiae are produced into curved spiniform processes at the end.

Length 6.5 mm.

FEDERATED MALAY STATES: Pahang, Bukit Lindong, Cameron's Highlands, 5000 ft. (*H. M. Pendlebury*), May. Two specimens.

This closely resembles the Bornean *C. bifossulatum* Grouvelle, but has numerous points of difference. It is less narrow and the antennae and legs are not so thick. The head is less narrow and produced and the eyes are reduced to extremely narrow and probably useless vestiges. The pronotum is more rectangular and less convex, its outer margins not being depressed as in the other species. The legs of the male are less stout, the front femur armed with a sharp tooth, the tarsi are longer and those of the front legs less dilated at the base. In *C. bifossulatum* the lateral grooves of the abdomen are much larger and the trochanters of the front and hind legs are toothed.

***Clinidium mishmicum* sp. n.**

Black, smooth and shining, with the legs deep red, the body broad and compact, with stout legs and thickened tarsi, the antennae fairly long, with joints 2-4 spherical, 5-10 rather transverse and 11 pointed. Head moderately elongate, the lateral lobes broad behind, almost straight at the inner edge, and the median lobe sagittiform, very broad between the antennae and sharply acuminate behind. Pronotum about as wide as the elytra and only a little longer than wide, rounded at the sides and broad at the base, with three entire dorsal grooves, the median groove not broad, scarcely dilated in front, contracted behind, containing an orifice before the middle and another behind it, the inner thoracic costae very broad, scarcely narrowed in front, narrowed but not compressed behind. Elytra unpunctured, each bearing three broad dorsal costae, the innermost abbreviated at the base, producing a deep, rather narrow cavity, the 2nd abbreviated behind and the 3rd curved and thickened at its hinder extremity.

♂. The front femur is toothed at its anterior edge and the middle and hind tibiae are short and produced inward at the end.

Length 7 mm.; max. breadth 2 mm.

ASSAM: Chauliang, Delai Valley, Mishmi Hills, 4840 ft. (*Miss M. Steele*), December. A single specimen.

Although nearly related to the Burmese *C. waterhousei* Grouvelle, this differs conspicuously from it by its peculiarly broad and compact shape. The lateral lobes of the head are more widely separated and less oval and the median lobe is more produced behind. The median groove of the thorax is less narrow and the inner costae are very broad, narrowed but flat and not compressed at the base. Another Burmese species, *C. fairmairei* Grouvelle, is evidently nearly related to *C. mishmicum* but this also is a more slender insect and the median groove of the pronotum is much broader, with a wide dilatation behind the middle. The Formosan *C. rimoganense* Miwa has, to judge from the figure, an exceedingly close resemblance to *C. waterhousei* Grouvelle.

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DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPT.)¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

1 *Oxyporus excellens* sp. n.

Shining, black, the elytra with a broad yellow oblique fascia extending from the humeral region nearly to the suture beyond the middle, the last two abdominal tergites yellow. Antennae and legs pale yellow, the tibiae black. Length 8-9 mm.

Darjeeling district: Ghum. Type in my collection.

Except for the colour and somewhat longer head, with longer post-ocular region, similar to *O. terminalis* Cameron.

2 *Oxyporus terminalis* sp. n.

Shining black, the lateral margin and posterior third of the 7th and whole of the 8th tergites yellow. Antennae and legs pale yellow, the tibiae black. Length (excluding mandibles) 8-9 mm. Near *O. stigmaticus* Cameron but differently coloured. Head slightly broader than long, larger in the male, the post-ocular region gently rounded, about twice as long as the eye in the male, about 1½ times in the female, broader than the thorax, on the front with an impression, impunctate; thorax transverse with feebly rounded sides retracted behind, just before the middle with a transverse sulcus, before the base with two nearly parallel longitudinal sulci, impunctate. Elytra uneven, on the disc with broad, longitudinal coarsely and closely punctured sulcus, otherwise practically impunctate.

Darjeeling district: Ghum. Type in my collection.

3 *Oxyporus tricolor* sp. n.

Shining, head and thorax red, elytra yellowish-red, the postero-external region from the middle of the side to the apex of the suture, black; abdomen with the first two visible tergites yellow in the middle of each with a small blackish spot, the 3rd black with the side margin and a triangular spot adjacent, yellow, 4th except for the anterior part of the lateral margin black, 5th similar, 6th black with the posterior half yellow. Mandibles black. Antennae, palpi and legs yellow. Length 7.75-9 mm.

Darjeeling district: Ghum. Type in my collection.

Belongs to the section with two transverse thoracic sulci which includes also *O. bucephalus* Fauvel and *O. birmanus* Cameron, to which latter species *tricolor* is closely allied and has the same colour pattern but the mandibles are black, and the elytra more yellow in colour, moreover the head is broader, the thorax

¹ Continued from 1942, *Proc. R. ent. Soc. Lond. (B)* 11: 110.

more transverse and the punctures of the elytra less numerous and not so close, in other respects similar to *birmanus*.

4 *Stenus* (s.str.) *vorticosus* sp. n.

Size and build of *tortuosus* Cameron, and extremely like it, but the thorax is less uneven, less coarsely rugose, the radiating and tortuous rugae of the elytra less coarse and the abdomen very much more coarsely and closely punctured. The intermediate segments of the antennae are darker, of a brownish-yellow colour.

Darjeeling district : Ghum, Tiger Hill, altitude 8500–10,000 feet. Unique. In my collection.

5 *Stenus* (*Parastenus*) *montivagans* sp. n.

Shining black with strong brassy reflex. Antennae, palpi and legs reddish-yellow, the club of the former infusate. Length 3 mm.

Near *S. grossepunctatus* Reitter but with brassy reflex and more coarsely punctured abdomen, the head broadly excavate and scarcely elevated along the middle, the antennae scarcely differing in structure. Head as broad as the elytra posteriorly, more coarsely punctured than in *grossepunctatus*. Thorax as long as broad, the sides rounded, widest about the middle, rather more retracted behind than in front, coarsely closely and rugosely punctured as in *grossepunctatus*. Elytra as long as the thorax, widened behind, closely and more coarsely punctured. Abdomen narrowed from base to apex, very finely margined, coarsely and closely punctured. The upper surface practically glabrous.

♂. 6th sternite with feeble arcuate emargination; 5th at the middle of the posterior margin more finely and more closely punctured than elsewhere.

Darjeeling district : Ghum, Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

6 *Stenus* (*Parastenus*) *kashmiricus* sp. n.

Moderately shining, black. Antennae brownish-yellow, the club blackish, 3rd segment of palpi pitchy. Femora reddish-brown, blackish towards apex, tibiae blackish, tarsi reddish-yellow spotted with black. Length 3.5–4 mm.

Somewhat resembling *montivagans* Cameron in build, but differently coloured, less coarsely punctured, head narrower, thorax slightly longer and bisulcate on the disc. Head as broad as the elytra behind, bisulcate, the raised median ridge occasionally with a small shining plaque, closely, moderately coarsely, rugosely punctured. Antennae slender, rather short, the penultimate segments about as long as broad. Thorax slightly transverse (2.3 : 2), the sides rounded and dilated in front, rather strongly retracted behind, the disc longitudinally bisulcate, the sculpture rugose, distinctly coarser than on the head. Elytra as long as the thorax, widened behind, more coarsely punctured, rugose. Abdomen narrowed towards the apex, very finely margined, closely and nearly as coarsely punctured as the head on the anterior segments, more finely on the last two.

♂. Unknown.

Kashmir : Gulmarg, altitude 8000–10,000 feet.

7 *Stenus* (*Hypostenus*) *siwalikensis* sp. n.

Very near *consors* Fauvel, of the same size, colour and lustre, the antennae similarly constructed but slightly infusate at the apex, the thorax, however, is narrower and more cylindrical, the sides less rounded, the sculpture a little coarser, the sculpture of the elytra scarcely differs from that of *consors*. The punctuation of the first three visible tergites is similar to that of *consors* but is much finer on the last three than in that species, finally

the white pubescence at the bases of the first three visible tergites is much thicker and longer than in that species. In other respects similar. Length 5 mm.

♂. 6th sternite with rather broad triangular excision.

Siwaliks : Lachiwala. Type in my collection.

6 *Stenus (Mesostenus) rubronotatus* sp. n.

Near *S. pseudoposticus* and *S. lopchuensis* Cameron. Differs from both in the elytral spot being smaller and round and also of a much duller orange-red colour, the femora also are distinctly infusate apically. The head is as broad as the elytra with structure and sculpture as in *lopchuensis*. The antennae are distinctly shorter than in *pseudoposticus* but longer than in *lopchuensis*. The build and sculpture of the thorax and elytra scarcely differs from that of the latter species, but the puncturation of the abdomen is finer than in both and is without the metallic reflex seen in *pseudoposticus*. Length 7.3 mm.

♂. 6th sternite with small rectangular excision at the middle of the posterior margin : 5th flattened along the middle, the posterior part of the impression more finely punctured and more closely pubescent than elsewhere.

Darjeeling district : Ghum. Unique. In my collection.

7 *Stenus (Mesostenus) mangpuensis* sp. n.

Black, moderately shining, with slight coppery reflex more marked on the abdomen. Antennae reddish-yellow, the club infusate. Legs reddish-yellow. Length 5.75 mm.

Head as wide as the elytra behind, broadly bisulcate and with a smooth boss on the vertex, otherwise coarsely and closely punctured. Antennae slender, rather long, the 4th and 5th segments long, of equal length, 6th and 7th of equal length, shorter than the preceding, 8th shorter than 7th, 9th and 10th a little shorter but stouter than the 8th, but distinctly longer than broad. Thorax slightly longer than broad (3 : 2.75), widest at the middle and rounded, equally retracted in front and behind and a little sinuate before the posterior angles, uneven, sulcate along the middle, impressed at the sides, at the base with a pair of superficial impressions, more coarsely and rugosely punctured than the head. Elytra as long as the thorax, slightly widened behind, uneven, coarsely and closely punctured, with some strong longitudinal rugae on the disc. Abdomen narrowed from base to apex, finely bordered, moderately finely, closely punctured on the first two visible tergites, equally closely but much more finely and obsoletely on the following.

♂. Unknown.

Darjeeling district : Ghum; Mangpu, Rongdong Valley. Type in my collection.

10 *Stenus (Mesostenus) separandus* sp. n.

Very similar to *S. virgula* Fauvel, but differing in the following respects, the sculpture of the head a little coarser, thorax without median sulcus, the puncturation of the abdomen as close but coarser, almost as coarse on the 4th and 5th visible tergites as on the anterior and very much coarser than in *virgula*. Length 4 mm.

♂. Middle and posterior tibiae with a minute black tooth at inner border of the apex. 5th sternite flattened at the middle of the posterior margin and there more finely and closely pubescent : 6th with feeble arcuate emargination of the posterior border, broader and less deep than in *virgula*.

Stenus (Mesostenus) separandus form *evanescens* form. n. ; in this the elytral spot is entirely absent.

Darjeeling district : Ghum.

11 ***Stenus (Mesostenus) pseudopictus* sp. n.**

Black, the elytra with oval bright orange-yellow spot postero-externally equally distant from the lateral and posterior borders, much farther from the sutural; abdomen more shining than the fore-parts with distinct greenish metallic reflex. Antennae with the first three or four segments yellow, the following infusate. Palpi and legs reddish-yellow. Length 7 mm.

Near *S. posticus* Fauvel, but with much longer slender antennae and also differs in the following respects: less shining, antennae darker, thorax a little longer and narrower (4:3), uneven, sulcate along the middle, the sulcus nearly reaching the anterior border but not the posterior, before the base on each side with short obsolete impression, the coarse close sculpture more rugose, abdomen with the first three visible tergites punctured as in *posticus* but the following distinctly less finely than in that species. Yet nearer *S. lopchuensis* Cameron, but with longer antennae, the head more coarsely punctured, thorax uneven as in that species and of similar build, abdomen with greenish metallic reflex, a little less closely punctured throughout, not at all rugose, in other respects similar.

♂. Unknown.

Darjeeling: Ghum district.

12 ***Stenus (Mesostenus) diversiventris* sp. n.**

In size, colour, lustre and antennal structure resembling *S. gestroi* Fauvel, but with the median sulcus of the thorax less deep and the sculpture distinctly coarser, elytra a little more coarsely punctured and at once distinguished by the much coarser puncturation of the last three tergites which is only a little less coarse than on the anterior, whereas in *gestroi* it is considerably finer. In the male the excision of the 6th sternite is smaller and narrower than in that species.

• Naga Hills: Laimatak. Type in my collection.

13 ***Dianous adjacens* sp. n.**

Black, moderately shining with slight greenish reflex, the elytral rosette with coppery reflex. Antennae, legs and palpi black. Length 5.5 mm.

Near *D. tortuosus* Champion, but a little smaller and narrower, the head narrower, the juxta-ocular sulcus scarcely indicated, the puncturation a little finer, the antennal segments shorter, the thorax in front more dilated, shorter, but as long as broad, along the middle with a narrower sulcus but without a median basal keel, the lateral impressions weaker, the sculpture equally close but not quite so coarse; elytra less uneven, the well-marked longitudinal impression between the shoulders and suture seen in *tortuosus* is absent, the sculpture not quite so coarse. In other respects like *tortuosus*.

♂. Unknown.

Darjeeling district: Ghum; Rongdong Valley.

14 ***Dianous sikkimi* sp. n.**

Shining black. Antennae and legs black. Posterior tarsi with the 1st segment about as long as the 5th, the 4th not bilobed. Length 5 mm.

Near *D. radiatus* Champion, but smaller, deep black without greenish reflex, the puncturation of the head scarcely differing, that of the thorax a little less close, the sculpture of the elytra similar in character to that of *radiatus* but distinctly coarser. In other respects similar.

♂. 6th sternite with broad and rather deep triangular excision: 5th with small flattened area at the middle of the posterior margin, which is more closely pubescent.

Darjeeling district: Ghum; Mangpu, Rongdong Valley. Type in my collection.

15 ***Aulacosthaetus indicus* sp. n.**

Only differs from *Stenaesthetus quadrisulcatus*² Cameron in the following respects: head except for a few small obsolete punctures along the base, impunctate, thorax with the lateral sulci extending almost to the anterior border, the anterior half closely, moderately coarsely punctured, the elytra as closely but more coarsely and deeply punctured, in all other respects similar. Length 2.5-3 mm.

Darjeeling district: Ghum. Type in my collection.

16 ***Edaphus binodulus* sp. n.**

Shining reddish-yellow. Thorax with fine keel along the middle, the base with six small foveae. Antennae and legs yellow. Length 1.2 mm.

Differing but little in build from *E. carinicolis* Bernhauer and the antennae of similar structure, but at once distinguished by the distinctly punctured elytra. Head bisulcate but with less strongly elevated median area and with the lateral margins more strongly raised and broader, the eyes larger. Thorax slightly transverse, the sides in front more dilated than in *carinicolis*, at the base with six small foveae,³ the two external ones not separated by a sharp keel from one another, along the middle with a fine keel almost reaching the anterior border, very finely and sparingly punctured as in that species. Elytra longer than the thorax (2.5:2), finely, rather closely and distinctly punctured. Pubescence very sparing on the thorax, more evident on the elytra and abdomen which is also very finely and moderately closely punctured. Ground sculpture absent throughout.

Darjeeling district: Ghum, Tiger Hill, altitude 8500-10,000 feet. Unique. In my collection.

17 ***Edaphus brevipennis* sp. n.**

Of the usual shining reddish colour, with yellow antennae and legs but with short elytra. Head a little narrower than the thorax, the eyes very small, the temples prominent and dentiform, the frontal margin broad, feebly rounded, the whole vertex deeply and broadly impressed, with a pair of foveae posteriorly and without raised central area, the side margin between the eye and antennal tubercle somewhat elevated and obtusely angulate, at the base with a few small punctures placed transversely and two or three others near the base of the antennal tubercle; ground sculpture and pubescence absent. Antennae moderate, slender, the first three segments elongate, subequal, 4th to 7th shorter but longer than broad, decreasing in length, 8th and 9th moniliform, 10th much stouter, scarcely transverse, 11th oval. Thorax transverse (3.5:3), the sides rounded and dilated in front, strongly arcuately retracted behind, at the posterior angle with a deep fossa, at the base with four smaller ones, along the middle with a fine keel, rather coarsely and rather closely punctured, with scanty pubescence and without ground sculpture. Elytra as long as but broader than the thorax, distinctly widened behind, transverse (4.2:3), very finely, sparingly and obsoletely punctured on the disc, much less finely, distinctly punctured at the sides, with rather long, sparing pubescence. Abdomen widest before the middle, a little narrowed at the base, more strongly towards apex, the puncturation extremely fine and scanty, sparingly pubescent. Length 1.5 mm.

Darjeeling district: Ghum. In moss. Type in my collection.

² This species must be removed to *Aulacosthaetus* Bernhauer (1939).

³ *Edaphus carinicolis* is described as having only four basal foveae, but I find that there are six, the two outer ones being very small and not separated from one another by a sharp keel as in the present species.

NOTES ON THE GENUS *EUPLOEA* FABR. (LEPID. DANAIDAE)

By G. TALBOT, F.R.E.S.

WITH the publication of Corbet's paper (1942, "Revisional Notes on the genus *Euploea* F.", *Ann. Mag. nat. Hist.* (11) 9: 253-267)¹ and his key to the Indo-Malayan species which follows these notes, it can be claimed that order has been imposed in this rather difficult group, and that the classification of the species is now placed upon a secure foundation. Previously the genus was in a somewhat chaotic condition although three notable attempts were made to classify the species: namely by Moore (1883), Fruhstorfer (1910), and Hulstaert (1931). In order to complete the work begun by Corbet it has been necessary to examine the status of many names given by the older authors. The present paper is the result of this examination.

Descriptions of forms named by the following authors have been studied: C. Felder, C. and R. Felder, Godart, Boisduval, and Lucas. Most of the types of Felder (Coll. Rothschild) and those of Boisduval (Coll. Oberthür) are now in the British Museum (Natural History) and have been examined. As a result of this examination a few changes in nomenclature have become necessary.

The key to the species, in the paper which follows, is constructed upon the males. It has been found impracticable to make a key for separating the females throughout the range of the species. It would only be possible to do this for the species occurring within a given geographical area.

Generally speaking, in the female the wing-pattern, particularly on the underside, partakes much of the male, and is often quite similar.

In the female of most species the fore-wing underside, in area 1*b*, has a pale stripe. The length, thickness, and definition of this stripe, and its distance from the pale area in lower part of 1*b* is not always constant.

In females of the following species there is no stripe in 1*b*, or it is vestigial, or it is represented by a normal pattern-spot: *Eleusina* group, *Tulliolus* group, *Phaenareta* group, *klugii* Moore, *leucostictos* (Gmelin), *usipetes* Hew., *diocletianus* (F.).

Much more work remains to be done on the subspecies and known distribution of the forms, but it must wait for a more suitable opportunity than the present.

I am indebted to the Trustees of the British Museum for facilities accorded in carrying out the present study; and I am grateful to Dr. Corbet for his advice and help in clearing up difficult points. Dr. Corbet is in full agreement with the views on nomenclature expressed herein.

CHANGES IN NOMENCLATURE AND STATUS.

1. *Names used by Corbet (1942).*

Page 258, *algea* (Godart). This name retains its position in replacing *duponchelii* Boisduval. *baudimiana* (Godart): Relegated to *species incertae*.

¹ References to all other works quoted in this paper are to be found in Bryk, 1937, *Lep. Cat.* 78, DANAIDAE I.

helcita Boisduval: Replaced by *lewinii* C. & R. Felder, the name *helcita* being applied to the species known as *whitmei* Butler.

Page 259, *buxtoni* Moore. This is the subspecies of *modesta* from southern Sumatra (Bovenlanden), *ainoae* Bryk being the race from north-eastern Sumatra.

Page 260, *leachii* C. & R. Felder. This is a synonym of *redtenbacheri* C. & R. Felder.

Page 262, *eleutho* (Godart). This is replaced by *algea* (Godart). *Swainsoni* complex: This becomes the *Algea* complex. *duponchelii* Boisduval: A synonym of *algea* (Godart).

Page 266, *latifasciata* Weymer. This includes *nubaida* (Grose-Smith) and *radica* Fruhstorfer as subspecies. *honesta* Butler: A subspecies of *batesii* C. & R. Felder. *euphon* (F.): *goudotii* Boisduval and *desjardinsii* (Guérin) are subspecies of *euphon* (F.).

Page 267, *dalmanii* C. & R. Felder. This should be *morosa* Butler. The true *dalmanii* is a subspecies of *algea* (Godart).

melanopa Röber. This should be *netscheri* Snellen. The true *melanopa* is a synonym of *lapeyrousei* Boisduval.

2. Names not mentioned by Corbet (1942).

donovani C. & R. Felder. Replaces *lucasi* (Moore), 1883. *lewinii* C. & R. Felder: Replaces *mathewi* Poulton, 1924. *malaguna* Ribbe: A synonym of *lacon* (Grose-Smith). *staintonii* C. & R. Felder: A synonym of *hisme* Boisduval. *lykoatis* Fruhstorfer: A synonym of *algea algea* (Godart).

EXAMINATION OF MALE GENITALIA.

Corbet (1942: 266) refers to the uncertain status of *boisduvalii*, *melanopa*, *eurianassa* and *dalmanii*. The name *netscheri* Snellen must be substituted for "*melanopa*" and *morosa* Butler for "*dalmanii*."

Dr. Corbet has examined the genitalia of these and of some other forms and finds no evidence to suggest that the arrangement given is incorrect.

E. euphon (F.) is regarded as being conspecific with *goudotii* and *desjardinsii*. The genitalia, of the usual *Euploea* type, show no differences. A comparison of the wing-markings suggests close relationship, especially between *euphon* and *desjardinsii*. In some specimens of *goudotii* there is an approach to the hind-wing underside band of *euphon*.

E. latifasciata, *nubaida* and *eboraci* have the usual *Euploea* type of genitalia. The first two are regarded as being conspecific.

E. batesii and *honesta* show no differences in genitalia. These forms do not occur together, and a form (as yet unnamed) found in Kirwina is somewhat intermediate. They are regarded as being conspecific.

E. netscheri, *eurianassa* and *morosa* have similar genitalia. *E. netscheri* and *morosa* both occur on the island of Gebi (or Gebeh), whilst *netscheri* is found with *eurianassa* in the region of Astrolabe Bay. No real intermediates have been seen by me. It is proposed to treat all three as representing distinct though closely allied species.

E. usipetes has the same genitalia as *leucostictos*. Both occur together in Dutch New Guinea and in the Mandated Territory of New Guinea. In the Aru Is. only *usipetes* seems to occur. Although closely allied to *leucostictos*, it is proposed to retain the specific rank of *usipetes*.

SPECIES DESCRIBED BY C. AND R. FELDER, J. A. BOISDUVAL,
J. B. GODART, F. MOORE, AND BY W. DOHERTY.

1. *Species described by C. and R. Felder.*

A careful study has been made of all the Euploeas described by C. and R. Felder. These are arranged in the subjoined table in alphabetical order. The first column gives the name, the page reference in the *Reise Novara*, and the sex; the sign ○, prefixed, indicates that the type was not identified in the Felder Coll. in the British Museum (N.H.), and may be in Vienna. The second column gives the present designation and whether treated as a synonym. The third column gives the type locality; a number, in brackets, refers to notes which follow the table.

The types of all the Felder names have been examined with the exception of those marked ○.

As is usual with most old collections, a "type" label is not attached to any specimen. Where only a single specimen was found to exist among the Felder material this became the true holotype. In other cases the specimen selected as type is, of course, a lectotype. The specimens so chosen bear data given by the Felders in their descriptions, and where figures were published the specimens agree with such figures. It was, therefore, usually easy to select the specimen which the authors had before them in making their diagnoses.

Notes.

1 (*arisbe*). Only one male from Coll. Felder conforms to the original description. It is labelled "Mus. Berol.". The hind-wing has the white patches merged to form a border, a variation mentioned by the authors as being found in the species. This specimen is, apparently, a co-type. The type should have five separate white patches on hind-wing, a character usual in *darchia* from Timor. In Felder's own copy of "Kirby" he marked *arisbe* as "sp. diversa."

2 (*dalmanii*). A male and female from Coll. Felder were examined. The male is without data but the female bears a name-label and the locality "Gilolo", and belongs certainly to the male, though this male agrees with *duponchelii* from Amboina. The female belongs to the Gilolo subspecies hitherto known as *dodingensis* (Moore).

3 (*donovani*). The types agree with *lucasi* (Moore) from Mindanao. There is some slight variation in the size of the submarginal dots on both wings and of the post-discal spots of hind-wing in this form.

4 (*erichsonii*). Type male, labelled "Assam", agrees very well with a male from Burma in the British Museum. The form is not known from Assam. The female type is of the usual form, without post-discal spots on fore-wing. It bears the label "Cochin".

5 (*frauenfeldii*). The male type represents the dark form peculiar to the southern Nicobars. In this form the hind-wing underside is without submarginal spots or has only vestiges. The type has a single submarginal spot in area 4.

6 (*geyeri*). A synonym of *wallengrenii* C. & R. Felder, not of *eyndhovii* C. & R. Felder. Represents the form with a complete row of submarginal spots on hind-wing underside.

Species in the *Reise Novara*.

Name.	Present designation.	Type locality.
<i>angasii</i> , 343, ♂♀	<i>core corinna</i> (McLeay) (syn.)	South Australia
<i>arisbe</i> , 323, ♂	<i>darchia</i> (McLeay) subsp.	Timor. (1)
<i>assimilata</i> , 321, ♂♀	<i>leucostictos</i> (Gmelin) subsp.	"Ins. Arru" [<i>recte</i> Key Is.]
<i>batesii</i> , 331, ♂♀	<i>batesii batesii</i> C. & R. Felder	Halmaheira
<i>bernsteinii</i> , 319, ♂♀	<i>leucostictos</i> (Gmelin) subsp.	Halmaheira
<i>castelnau</i> , 314, ♀	<i>phaenareta</i> (Schaller) subsp.	Malaya
<i>configurata</i> , 326, ♀	<i>mulciber euctemon</i> Hewitson (syn.)	North Celebes
<i>consimilis</i> , 329, ♂	<i>sylvester coreta</i> (Godart) (syn.)	"Java" [<i>recte</i> S. India]
<i>cuvieri</i> , 315, ♂	<i>phaenareta</i> subsp.	Halmaheira
<i>dalmanii</i> , 332, ♂♀	<i>alga</i> (Godart) subsp.	Halmaheira. (2)
<i>donovani</i> , 343, ♂♀	<i>swainsoni</i> (Godart) subsp.	"Celebes" [<i>recte</i> Minda-nao]. (3)
<i>doubledayi</i> , 337, ♂♀	<i>doubledayi doubledayi</i> C. & R. Felder	Sylhet
<i>erichsonii</i> , 324, ♂♀	<i>klugii</i> Moore subsp.	"India sept." [<i>recte</i> Burma]. (4)
<i>eschschoitzii</i> , 345, ♂	<i>lewinii</i> C. & R. Felder subsp.	Fiji
<i>euthoe</i> , 316, ♂	<i>phaenareta</i> (Schaller) subsp.	Aru Is.
<i>eyndhovii</i> , 338, ♂	<i>eyndhovii eyndhovii</i> C. & R. Felder	Java
<i>forsteri</i> , 322, ♂	<i>tulliolus</i> (Fabr.) subsp.	Fiji. (27)
<i>fraternus</i> , 321, " ♂ "	<i>leucostictos assimilata</i> C. & R. Felder ♀ (syn.)	"Ins. Arru" [<i>recte</i> Key Is.]. (19)
<i>frauenfeldii</i> C. Felder, 1862, 342, ♂	<i>crameri</i> Lucas subsp.	"Ceylon" [<i>recte</i> S. Nicobars]. (5)
<i>geyeri</i> , 338, ♂	<i>alga wallengrenii</i> C. & R. Felder (syn.)	Java. (6)
<i>grayi</i> , 346, ♂	<i>wallacei</i> C. Felder subsp.	Aru Is.
<i>groeci</i> , 339, ♂♀	<i>midamus</i> (L.) subsp.	Cochin China
<i>guérini</i> , 332, ♂	<i>alga</i> (Godart) subsp.	Aru Is.
<i>harrisi</i> , 328, ♂	<i>sylvester</i> (F.) subsp.	Cochin China
<i>herrichii</i> , 344, ♂	<i>boisduvalii boisduvalii</i> Lucas	Fiji
<i>hewitsonii</i> , 326, ♂♀	f. <i>herrichii</i> (= <i>proserpina</i> Butl.).	"Celebes" [<i>recte</i> S. Celebes]. (7)
<i>hopei</i> , 328, ♂	<i>sylvester</i> (F.) subsp.	Assam
<i>hopfferi</i> , 323, ♂♀	<i>darchia</i> (McLeay) subsp.	"Ins. Arru" [<i>recte</i> Key Is.]
<i>horsfieldii</i> , 333, ♂♀	<i>alga</i> (Godart) subsp.	South Celebes (8).
<i>kirbyi</i> , 334, ♂♀	<i>alga</i> (Godart) subsp.	North Celebes. (9)
<i>kollari</i> , 325, ♂	<i>klugii</i> Moore subsp.	"India sept." [<i>recte</i> Burma]
<i>leachii</i> , 334, ♀	<i>redtenbacheri redtenbacheri</i> C. & R. Felder, ♀ (syn.)	"Celebes" [<i>recte</i> South Celebes]
<i>ledereri</i> C. Felder, 1860: 317, ♂	<i>tulliolus</i> (F.) subsp.	Malaya
<i>lewinii</i> , 345, ♂	<i>lewinii lewinii</i> C. & R. Felder	"Australia sept." [<i>recte</i> Tonga Is.]. (10)
<i>lorquini</i> , 340, ♂♀	<i>core amymone</i> (Godart) (syn.)	S.E. China
<i>macleayi</i> , 320, ♂♀	<i>leucostictos</i> (Gmelin) subsp.	Fiji. (11)
<i>montana</i> , 330, ♂♀	<i>sylvester</i> (F.) subsp.	Ceylon
<i>montrouzieri</i> , 345, ♂	<i>lewinii Montrouzieri</i> C. & R. Felder	New Caledonia. (21)
<i>moorei</i> , 316	<i>core mazaes</i> Doubleday (syn.)	Java. (12)
<i>novae</i> C. Felder, 1862: 317, ♂	<i>leucostictos</i> (Gmelin) subsp.	Car Nicobar
<i>pasithca</i> , 318, ♂♀	<i>leucostictos nemertes</i> (Hubner) (syn.)	Amboina
<i>payeni</i> , 329, ♂	<i>sylvester</i> (F.) subsp.	Aru Is. (13)
<i>pierretii</i> , 331, ♀	<i>alcathoe</i> (Godart) subsp.	Dorey, Dutch New Guinea
<i>poeyi</i> , 340, ♀	<i>alga deione</i> Westwood, ♀ (syn.)	Assam
<i>redtenbacheri</i> , 330, ♂	<i>redtenbacheri redtenbacheri</i> C. & R. Felder	"Ins. Arru" [<i>recte</i> Celebes]. (14)
<i>rogenhoferi</i> , 325, ♂	<i>midamus</i> (L.) subsp.	"India sept." [<i>recte</i> Assam]

Name.	Present designation.	Type locality.
<i>saundersii</i> , 322, ♂♀ ° <i>scherzeri</i> C. Felder, 1862: 335, ♂ <i>schlegelii</i> , 327, ♂ <i>semperi</i> , 314, ♂♀ <i>siamensis</i> , 341, ♂♀ <i>staintonii</i> , 319, ♂♀ <i>stephensii</i> , 320, ♂ <i>trimenii</i> , 324, ♂♀ <i>vicina</i> , 337, ♂♀ <i>vollenhovii</i> , 327, ♂	<i>tulliolus</i> (F.) subsp. <i>core</i> (Cramer) subsp. <i>syvester</i> (F.) subsp. <i>multiciber</i> (L.) subsp. <i>core godartii</i> Lucas (syn.) <i>leucostictos hisme</i> Boisduval (syn.) <i>stephensii stephensii</i> C. & R. Felder <i>stephensii</i> C. & R. Felder subsp. <i>climena</i> (Stoll) subsp. <i>eleusina</i> (Cramer) subsp.	Aru Is. "Ceylon" [recte Car Nicobar] "Celebes" [recte N. Celebes] Mindoro. (26) Siam Waigeu. (15) Mysol Halmaheira. (16) Aru Is. (17) N.E. Celebes (Gorontalo). (18) Batjan. (25)
<i>wallacei</i> C. Felder, 1860: 346, ♂ <i>wallengrenii</i> , 336, ♂♀ <i>westwoodii</i> , 316, ♂♀ <i>zinckenii</i> , 335, ♂♀	<i>wallacei wallacei</i> C. Felder <i>algea</i> (Godart) subsp. <i>leucostictos</i> (Gmelin) subsp. <i>climena climena</i> (Stoll) (syn.)	Java S. Celebes. (24) Amboina
Species not in the <i>Reise Novara</i> .		
<i>bremeri</i> C. & R. Felder, 1860, ♂ ° <i>doleschalii</i> C. & R. Felder, 1859, ♂ <i>esperii</i> C. Felder, 1862, ♀ <i>ménétrièrii</i> C. & R. Felder, 1860, ♂♀ <i>mniszeczii</i> C. & R. Felder, 1859, ♂	<i>crameri</i> Lucas subsp. <i>syvester</i> (F.) subsp. <i>crameri</i> Lucas subsp. <i>algea</i> (Godart) subsp. <i>eleusina</i> (Cramer) subsp.	Malaya New Guinea. (23) Car Nicobar. (20) Malaya "Celebes" [recte South Celebes]. (22)

7 (*hewitsonii*). The male type represents the form in which the hind-wing scent area is not darkened, a character apparently peculiar to specimens from South Celebes. In the female of this form the hind-wing underside has the stripe in area 7 much broader than in the northern subspecies, also the cell shows an enclosed streak of dark ground-colour, this streak in *hyacinthus* Butler being extended to outer margin of cell. The female allotype belongs to *hyacinthus*.

8 (*horsfieldii*). The male type represents the subspecies from South Celebes.

9 (*kirbyi*). The types represent the subspecies from North Celebes.

10 (*lewinii*). Male type labelled "Nord Austral", referring probably to the Austral Islands. It belongs to *helcita* auct. (see page 13) and represents the subspecies from the Friendly Is. (Tongabatu) where the species has developed the broadest band on hind-wing. *E. lewinii* replaces *helcita* Boisduval (err. ident.) as a species. The name *mathevi* Poulton becomes a synonym.

11 (*macleayi*). ♂ type, on fore-wing upperside, with submarginal spot in area 3 minute; this spot is absent in some specimens in the British Museum. ♀ allotype with spots of both wings well developed; no marginal white suffusion.

12 (*moorei*). This name is a nom. nov. for *hübneri* (Moore), which is a synonym of *mazares* Doubleday. The Felders confused *hübneri* (Moore) with the insect known as *malayica* Butl., a Felder ♂ of which is labelled "*moorei*".

13 (*payeni*). The ♂ type represents *sylvester* from the Aru Is.

14 (*redtenbacheri*). A single specimen from Coll. Felder bears this name. It represents the male of *leachii* C. & R. Felder from South Celebes and has page priority.

15 (*staintonii*). ♂ type represents the dark form in which the fore-wing is without white scaling and has a paler outer border and two subapical bluish-white dots in areas 6 and 7. ♀ allotype resembles the ♂. Fore-wing with traces of bluish submarginal dots in areas 2 to 6. Underside fore-wing without subapical and submarginal spots. Hind-wing outer border pale, more so from inner margin to vein 5 on both sides; upperside with three bluish-white spots in areas 4 to 6, underside with four such spots in 4 to 7. The name becomes a synonym of *hisme* Boisd. (*q.v.*).

16 (*trimenii*). ♂♀ types labelled Halmaheira (Dodinga). Male agrees with Halmaheira specimens in British Museum, but no female is available for comparison. The names *salabanda* Kirsch and *engrammelli* (Moore) are synonyms.

17 (*vicina*). Both sexes were described but only a female was found in the Felder material. This resembles the subspecies from Banda, but hind-wing with a broader white border, its inner edge well defined, much as in *eurypon* Hew. from Key. Similar specimens are in the British Museum (ex Oberthür) from Gisser Island near Ceram. I have seen no authentic Aru specimens. Two specimens, from the Joicey Coll., bearing Aru labels, probably came from Key. It is still uncertain whether *vicina* occurs on Aru or whether the Gisser specimens are correctly labelled.

18 (*vollenhovi*). ♂ type has hind-wing with two discal spots (in areas 2 and 3); no spot in end of cell: underside without white patches. Another form occurs also in northern and eastern Celebes. This has discal spots of hind-wing twice as large, and there is a small spot in end of cell.

19 (*fraterna*). Type a female labelled "Aru (Lorquin)". Fore-wing underside with only one post-discal spot (in area 2). Hind-wing spots in area 7 small, the proximal one smaller than is usual in *assimilata*; spot in 6 merged with marginal white. Apparently a small female of *assimilata* of which no specimens have been recorded from Aru.

20 (*esperi*). Type a female from Car Nicobar. Hind-wing underside with submarginal row of spots complete and prominent.

21 (*montrouzieri*). Type a female. The specimen has no tornal spot on either side of fore-wing. Misidentified by all authors as *helcita* Boisdual.

22 (*mniszeczhii*). On hind-wing underside, in end of cell, the type has a large, somewhat elongate-ovate, spot with a proximal linear prolongation; most specimens have only a dot or small spot.

23 (*doleschallii*). Type apparently not in Coll. Felder, but only the form figured as a var. in *Wien. ent. Monatsschr.* 3: pl. 5 fig. 2.

24 (*westwoodii*). ♂ type is without post-discal white spots on fore-wing. ♀ allotype with fore-wing spots in areas 2 and 3 narrow; hind-wing spots broad and long. The male is labelled "Macassar" and also "Celebes (Wallace)". The female is without locality label.

25 (*wallacei*). ♂ type labelled "Batchian". Fore-wing underside with a small blue spot in end of cell.

26 (*semperi*). A male which is without any Felder label, but is certainly a Felder specimen, is taken to be the type. ♀ allotype labelled "Mindoro (Semper)". Fore-wing spots smaller than in British Museum specimens, and the lower of the two inner stripes is absent.

27 (*forsteri*). ♂ type on fore-wing underside without a spot in area 2; hind-wing paler than is usual. Upperside fore-wing blue spots with white scaling as is usual; hind-wing without spots.

2. Species described by J. A. Boisduval.

Eleven species appear to have been described. The types of ten of these are in the British Museum (N.H.) from Coll. Oberthür. The type of *duponchelii* may be in Mus. Paris. The types examined are *adyte* (♂), *aglidice* (♀), *callithoe* (♂), *goudotii* (♂), *helcita* (♂), *herbstii* (♂), *hisme* (♂), *lapeyrousei* (♂♀), *orope* (♂), *treitschkei* (♂). Three of these call for comment.

(a) *Euploea hisme* Boisduval (1832).—The specimen bears the locality "Rawack", and Boisduval gives it as Buru. The specimen does not resemble any of the many Buru examples of *leucostictos* (Gmelin) in the British Museum. On the other hand, it resembles *leucostictos staintonii* C. & R. Felder from Waigeu, the form without submarginal spots on fore-wing. Hind-wing underside with distinct outer pale border, also present in *staintonii* but absent in the somewhat similar but darker subspecies *bernsteinii* C. & R. Felder from Halmaheira and Batjan.

The type agrees, for the most part, with the original description. Other specimens, also considered by Boisduval, are described as having a small maculate violet band on fore-wing. As these also are included in the first part of the description where the wings are described as "plus pâles à l'extrémité", they could have come from Waigeu or Dutch New Guinea. The Moluccan forms have no pale border or show it very obscurely in a few specimens.

The type of *hisme* was seen by Moore who, in 1883, gave the locality as Aru. The Aru subspecies of *leucostictos* is *assimilata* C. & R. Felder. No specimens resembling *hisme* are known from Aru.

It is here considered that *hisme* is synonymous with *staintonii* from Waigeu. The name for the Buru subspecies is, therefore, *bouruana* (Moore), 1883.

(b) *Euploea lapeyrousei* Boisduval (1832).—This was stated by the author to come from Java, Borneo, Sumatra, Amboina, Buru and New Guinea. The types agree with the subspecies of *algea* (Godt.) from northern Dutch New Guinea.

(c) *Euploea helcita* Boisduval (1859).—A Boisduval male specimen, in Coll. Oberthür, bears these labels: (1) "Typicum specimen" (printed in red); (2) "*Helcita* Bd., N^o Caledonic"; (3) "*Euploea helcita* Boisduval", with reference added; (4) "Vu par Moore en 1881". This specimen does not agree with the description but fits the conception of the species by Butler and Moore.

At the beginning of his diagnosis Boisduval says: "Appartient à ce groupe . . . dont les mâles sont caractérisés par une raie luisante glabre, sur le bord interne des ailes supérieures." Presumably the insect should possess a brand. "Port et taille de l'*éleutho* de l'île de Guam." This is vague but concerns size and shape, not the pattern. There is no reference to the large spots on fore-wing of specimen labelled as type, an omission, were it a fact, that would be entirely inconsistent with all Boisduval's careful descriptions of 1836 and onwards. Furthermore, the specimen has not the upperside "d'un brun noirâtre plus intense vers le milieu." Upperside of hind-wing has not a complete inner row of spots, but it is more than can be called half a row, as stated in the description. Post-cellular spots on underside of both wings white, whereas they should be violaceous. All these characters are to be found in

another *Euploea* from New Caledonia, described in 1877 by Butler as *whitmei*, from the Loyalty Islands.

A single male of *whitmei* (ex Boisduval) was found in Coll. Oberthür; it is without locality. This specimen was seen by Moore, and bears a label (probably affixed by Moore) "*Euploea whitmei* Butl., ♂". It agrees very well with the description of *helcita*. In the British Museum is also another male labelled "New Caledonia (Layard) (ex Druce Coll., Godm. & Salvin Coll.)".

The species *helcita* auct. was described in 1865 by C. and R. Felder as *montrouzieri*. As C. Felder was in correspondence with Boisduval, it may seem strange that he should have been in ignorance of the species described by Boisduval in 1859. Actually he quotes a species from this 1859 paper in 1862 (*Verh. z.-b. Ges. Wien* 12 : 495, no. 206).

In 1921 (*Bull. Hill Mus.* 1 : 28) I published some notes on *helcita*. As the description did not fit the *helcita* as then understood, I wrote to C. Oberthür for information. Oberthür explained the disparity by omission and abstention made by Boisduval, since it never occurred to him that the specimen in his collection was not the type. Therefore, in the absence of further evidence, my conception of *helcita* became that of previous authors.

In 1866 (*Proc. zool. Soc.* 1866 : 453) Butler classed *helcita* as a local form of *eleutho*. He was followed by Moore in 1883 (*Proc. zool. Soc.* 1883 : 257), who went farther and founded his genus *Nipara* upon *helcita*, including six species in the group, all being forms resembling *eleutho* but without a male brand. It may be surmised that the identity of *helcita* being thus apparently established, the Boisduval specimen, in Coll. Oberthür, was given a special type-label.

Moore did not say what types he had examined but noted in whose collection the species were. In the case of *helcita* no collection is mentioned.

The species known hitherto as *helcita* must be called *lewinii* C. & R. Felder, whilst *helcita* Boisduval will replace *whitmei* Butler, a subspecies of *algea* Godart. The name *lewinii* has place priority over *montrouzieri* and *eschschoitzii*, two subspecies described on the same page.

3. Species described by J. B. Godart.

The descriptions in the *Enc. Méth.* (1819, 1824) have been studied and, with two exceptions, do not call for comment.

(a) The species *algea* has given some difficulty. In 1925 Talbot and Le Cerf published a brief account of some species described by Godart, the types having been identified at the Mus. Paris. It is unfortunate that this paper did not include a more detailed account, with sexes and data on specimens. This would have avoided an unfortunate misunderstanding that arose in the case of *algea*. Some doubt was cast on the determination by Corbet (1942 : 258) after he had read the original description; this reasoning appeared correct to me when I also read over the description. Recently, when studying these descriptions again, it became apparent to me that we were both wrong in our interpretation of that part of the description relating to the two stripes on fore-wing underside. The original reads : "Le dessous des premières offre sur le milieu quatre ou cinq points d'un blanc-bleuâtre, séparés du bord interne par deux raies longitudinales, dont la supérieure d'un blanc moins vif, l'inférieure très pâle, plus longue et s'apercevant en dessus dans le mâle." The stripe "supérieure" is really an elongate spot in area 2, and the stripe "infé-

rieure" is a brand which appears on the upperside. The similarity of this description to that of *amymone* on the next page leaves no doubt that a similar characteristic is described in both cases. It is, therefore, impossible to assign the insect to *climena* (Stoll). The specimen examined by Talbot and Le Cerf was doubtless the male type of Godart; this agreed with the insect known as *duponchelii* Boisduval. There seems no valid reason for supposing that the specimen examined in Mus. Paris was not Godart's type.

A study of the material of *algea* in the British Museum (N.H.) from Amboina, Ceram and Buru, does not confirm the differences supposed to exist between the insects in each of these three areas. It is proposed to unite them under the name *algea* (Godart) with synonyms *duponchelii* Boisduval, *anthracina* Butler, and *lykoatis* Fruhstorfer.

(b) *Danaïs baudiniana* Godart. No specimens of *orope* Boisduval or of *timora* Fruhstorfer agree satisfactorily with the description. It may be either of these species, possibly a female, or it may be something else. It seems, therefore, advisable to treat *baudiniana* as a *species incerta*.

4. Species described by F. Moore from specimens in Coll. Oberthür.

Calliploea aristotelis (1883, N. Borneo), ♂♀.—The author states that this insect comes from "Sandakan, N. Borneo (Pryer)" and that it is in the collections of W. L. Distant and C. Oberthür.

The Oberthür specimen is a male labelled "Borneo", with a label "n. sp." in Moore's writing, and a label by Oberthür "vu par Moore en 1881".

The collection at Tring contains a female labelled "N. Borneo (Pryer)", with also a label in Moore's writing: "*Calliploea aristotelis* Moore, ♀ type". This specimen is probably from Coll. Distant.

The above female specimen is here selected as holotype, the Oberthür male being the allotype.

Deragena childreni (1883, "Java").—The type is a male labelled "*grayi* Boisd., Java". It belongs to the species *boisduvalii* Lucas, and appears to be nearest to *rileyi* Poulton from the Loyalty Is. There is nothing exactly resembling it in the British Museum (N.H.). The brand is 8.5 mm. long, a little shorter than in most *rileyi* and *torvina* Butler; it is slightly broader than in *rileyi* but not so broad as in *torvina*. The submarginal spots, more prominent on underside, and the absence of marginal pale borders on upperside distinguish it from its allies. The insect comes probably from a Pacific island, and *boisduvalii* is still not recorded from some areas.

Isamia fabricii (1883, "Cochin China").—Type a male from Coll. Boisduval labelled "*Isamia fabricii* Bd. descr. by Moore", with also a label by Oberthür: "Vu par Moore en 1881"; also a description, probably by Boisduval, entitled "*Euploea fabricii* Boisd." This ends by saying: "Nous avons reçu cette espèce de la Cochinchine."

The specimen represents a form of *midamus ochsenheimeri* Lucas, from Java, in which the fore-wing has only four small submarginal spots in areas 4 to 7. The nominotypical *ochsenheimeri* has a complete row of submarginal spots, a small cell-spot, and some post-cellular spots.

A third form, *rafflesi* (Moore), has a complete row of submarginal spots, less prominent than in the nominotypical form, and is without a cell-spot and post-cellular spots.

Crastia grammifera (1883, "Malaise"), ♂.—The type more resembles

Tonkin specimens of *core* (Cramer), but the locality is not known with certainty. See Talbot, 1940, *Ent. mon. Mag.* **76** : 247.

Isamia marseuli (1883, Saigon), ♂.—A form of *midamus grotei* C. & R. Felder in which the hind-wing spots are dusky and indistinct. The specimen is from Coll. Boisduval with a label "*marseulii*, Saigon", a name-label in Moore's writing, and a printed label by Oberthür: "Vu par Moore en 1881".

Crastia prunosa (1883, China).—Type a male, a form of *core amymone* (Godart) as usually understood to be the case.

5. Species described by W. Doherty.

Types of the following names have been determined from specimens in Coll. Oberthür.—*Euploea deheeri* (1891, Sumbawa), ♂; *Trepsichrois dongo* (1891, Sumbawa), ♂♀; *Trepsichrois elwesii* (1891, Sumba), ♀ holotype, in poor condition; *Euploea lewa* (1891, Sumba), ♂; *Stictoploea melolo* (1891, Sumba), ♂♀; *Euploea palmedo* (1891, Sumba), ♂.

MISCELLANEOUS NOTES.

buxtoni (Moore).—*E. modesta buxtoni* Corbet, 1942 : 259. Specimens of both sexes from Sumatra (Bovenlanden) were found in Colls. Adams and Oberthür. This is the subspecies from southern Sumatra and the locality "Sumatra" as given by Moore is thus correct.

lachrymosa (Grose-Smith).—This is the Jobi subspecies of *algea* (Godart). In appearance it resembles the Moluccan *algea* rather than *lapeyrousei* Boisduval and others from Dutch New Guinea, Waigeu and Salawatty.

malaguna Ribbe (1898).—This name sinks to *lacon* (Grose-Smith), 1894. Both authors failed to notice the short thin brand on fore-wing of male. A subspecies, *tripunctata* Jocey & Noakes (1915), occurs on the island of Biak.

morosa Butler (1866), Mysol.—This is the species called *dalmanii* C. & R. Felder by Bryk (1937) and Corbet (1942).

melanopa Röber (1887). Sekar, Dutch N.W. New Guinea.—A careful comparison of the figure given by Röber (*Iris* **1** : pl. 8 fig. 2) with a series of *lapeyrousei* Boisduval shows that these insects are identical. The latter form is confined to Dutch New Guinea. A specimen from Maccluer Gulf agrees very well with Röber's figure.

netscheri Snellen (1889, New Guinea).—This is the oldest name for the species called *melanopa* by Corbet (1942 : 267). The type locality is certainly Dutch New Guinea, probably Dorey.

The subspecies not correctly assigned in Bryk (1937) are as follow:—To *algea* (Godart).—*cissia* Fruhstorfer (Mysol), *parca* Fruhstorfer (Mand. New Guinea). To *algea lapeyrousei* Boisduval.—Forms *julica* Fruhstorfer, *potaissa* Fruhstorfer, *albifrons* Fruhstorfer, *delicia* Fruhstorfer. To *netscheri* Snellen.—*numantia* Fruhstorfer (Waigeu), *theriodes* Fruhstorfer (Eilanden River, Dutch New Guinea), *erana* Fruhstorfer (Mand. New Guinea).

rogeri (Geyer), 1837.—This insect is still known only by the figure in the *Zuträge*. This shows a female with white spots and bands reminiscent of *eleutho*, *corinna* and *sylvester*. There is a faint appearance of two inner stripes on fore-wing; this doubtless decided Moore and Fruhstorfer to place *rogeri* in the *Stictoploea* group. This position is, however, by no means certain. The insect shows some unusual pattern characters. Both wings have cell-

patches, fore-wing with two subapical spots, hind-wing with a subcostal stripe in area 7 on underside. These characters render it more distinct than usual for a subspecies of *core*, *algea* or *sylvester* within the areas covered by the particular pattern in forms of these species.

If the species occurred within the range of the white-banded and spotted forms found in the Austro-Malayan and Polynesian areas, it seems strange that it has not been rediscovered. If it occurred in the Malagassic Region its extreme rarity or even extinction would not be surprising.

The locality was given as Seychelles. This may not be impossible although one would have expected the common *core mitra* (Moore) to have been caught at the same time.

A comparison of the figure of *rogeri* with other Malagassic forms shows more approach to *euphon euphon* (F.) in the hind-wing pale band with its irregular outer edge, the absence of a white costal border on hind-wing upper-side, and the position of the post-cellular spots on fore-wing underside.

The species is placed provisionally after *euphon*. Its habitat is probably one of the islands in the Malagassic area.

A KEY FOR THE SEPARATION OF THE INDO-AUSTRALIAN AND AFRICAN SPECIES OF THE GENUS *EUPLOEA* F. (LEP. DANAIDAE)

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THE examination of the types and descriptions of the *Euploea* species denominated by the Felders and by Boisduval and the analysis of the descriptions of the Godart species which have been carried out by Mr. G. Talbot (Talbot, 1943, *Proc. R. ent. Soc. Lond.* (B) 12: 6) have elucidated practically all the outstanding difficulties concerned with the classification and nomenclature of this difficult genus. It has been possible also to examine the male genitalia of the remaining species outside the Indo-Malayan region so that the present classification rests on a firm foundation. The key which follows deals with the males and includes all the known *Euploea* species except *E. rogeri* (Geyer, 1837, and *E. blossomae* Schaus, 1929. The former was described from the Seychelles and is known only from Geyer's figure of the female. Schaus' species is founded on a unique male from Mindanao (type in U.S. National Museum) and its affinities cannot be recognised from the description: it may even represent an additional group.

The results obtained by Mr. Talbot have necessitated a few changes in my previous paper on the genus (Corbet, 1942, *Ann. Mag. nat. Hist.* (11) 9: 253): *algea* (Godart) is the oldest name for the *swainsoni* complex and *E. algea* should be used for the species referred to previously as *E. eleutho*; *algea* was described from Amboina, and *duponchelii* Boisduval falls as a synonym. The true type specimen of *helcita* Boisduval is a male representing the subspecies of *Euploea algea* from New Caledonia (= *whitmei* Butler): the oldest name for the species hitherto known as *E. helcita* is *E. lewinii* C. & R. Felder. *E. redtenbacheri* C. & R. Felder replaces *E. leachii*, the latter being an exact synonym. *E. morosa* Butler should replace *E. dalmanii* C. & R. Felder in my previous paper, the latter name referring to a race of *E. algea*. *E. netscheri* Snellen should be used in place of *E. melanopa* Röber, the latter being a synonym of *lapeyrousei* Boisduval. The forms *nubaila* (Grose-Smith) and *honestia* (Butler) have been found to be races of *E. latifasciata* Weymer and *E. batesii* C. & R. Felder respectively. Examination of further material by Mr. Talbot has shown that *E. modesta buxtoni* Moore is a good race from South Sumatra and not a Siamese form as I had supposed.

Key for the separation of groups.

- 1(14). F with a recurrent vein in cell.
- 2(9). ♂ upH without a pale raised patch in cell area.
- 3(4). ♂ upF without a brand *climena* group.
4. ♂ upF with one or two brands in space 1b.
- 5(6). ♂ upF with a single brand *core* group.
6. ♂ upF with two brands.
- 7(8). F termen curved as usual. ♂ upF anterior brand nearly as long as posterior brand *sylvestre* group.

8. *F* termen outwardly concave in middle. ♂ up*F* anterior brand much shorter and narrower than posterior brand *martini* group.
9. ♂ up*H* with a pale yellow or buff raised patch in cell area.
- 10(11). ♂ up*F* without a brand *muleri* group.
11. ♂ up*F* with a single brand in space 1b. ♂ *F* dorsum strongly curved.
- 12(13). *F* termen outwardly concave *gamelia* group.
13. *F* termen curved as usual *treitschkei* group.
14. *F* without a recurrent vein in cell.
- 15(16). ♂ up*H* without a prominent pale raised patch in cell area. ♂ up*F* with a single brand in space 1b: *F* dorsum strongly bowed *eleusina* group.
16. ♂ up*H* with a prominent pale yellow (white in *diocletianus*) raised patch extending into the cell.
- 17(20). ♂ up*F* without a brand.
- 18(19). ♂ up*H* pale yellow raised patch not extending below middle of cell. ♂ *F* dorsum strongly bowed *tulliolus* group.
19. ♂ up*H* pale yellow raised patch extending to within 1 or 2 mm. of median vein. ♂ *F* dorsum bowed *phaenareta* group.
20. ♂ up*F* with a single brand in space 1b. *midamus* group.

Key for the separation of species of the *climena* group (sub-genus *Vonona* Moore).

- 1(4). ♂ up*H* without a speculum, *i.e.* wing uniformly coloured below sub-costal vein and vein 7. ♂ *F* dorsum straight.
- 2(3). ♂ un*F* with a pale, narrow, elongate stripe in anterior portion of space 1b; whole of space 1b darkened, except anterior edge of vein 1 *E. euphon* (Fabricius), 1798.
(Mascarene Is.)
3. ♂ un*F* with space 1b unmarked, except for narrow area in space 1a extending into space 1b along central portion of vein 1. ♂ up*F* deep velvety blackish-brown; *H* paler, with termens broadly paler
E. doretta Pagenstecher, 1894.
(Bismarek Archipelago)
4. ♂ up*H* with a speculum, *i.e.* at least anterior portion of cell and basal portions of spaces 5 and 6 differently coloured to rest of wing.
- 5(22). ♂ up*H* speculum not blackened, and not containing wedge-shaped, fringed, androconial scales.
- 6(7). *F* with the white spot in space 3 much larger than any other spot.
- ♂ un*F* with obscure, pale, narrow, elongate stripe in anterior half of space 1b; posterior edge of space 1b and whole of space 1a pale and nacreous. ♂ *F* falcate, dorsum straight *E. lewinii* C. & R. Felder, 1865.
(New Hebrides to Cook Is.)
7. *F* with the white spot in space 3, when present, not much larger than any other spot. ♂ *F* not falcate.
- 8(9). ♂ up*H* space 7 more strongly whitened than contiguous spaces. ♂ un*F* with the whole of space 1a and often posterior edge and distal area of space 1b strongly whitened; in eastern races often with a narrow elongate pale stripe in anterior half of space 1b. ♂ *F* dorsum almost straight *E. climena* (Stoll), 1782.
(Engano and Java to Bismarek Archipelago)
9. ♂ up*H* space 7 not more strongly whitened than contiguous spaces.
- 10(13). ♂ up*H* pale greyish speculum extending to middle of cell; in some forms almost to the median vein. ♂ un*F* posterior half of space 1b paler and nacreous. ♂ *F* strongly bowed.

- 11(12). ♂ unF with a single pale, narrow, elongate stripe in anterior half of space 1b; posterior half of space 1b with a prominent pale yellow specialised area (greyish buff in Java and eastwards). ♂ upH with a pale yellow raised streak above the cell (obsolete in Java and eastwards). In western races, ♂ unH with a thick dark patch visible by transmitted light *E. modesta* Butler, 1866.
(Burma to Bismarck Archipelago)
12. ♂ unF with two moderately long and broad blackish stripes in space 1b, the two arranged to form a parallelogram, with the anterior distal edge nearer the termen; otherwise posterior half of space 1b and whole of space 1a greyish-white *E. crameri* Lucas, 1853.
(Burma to Malaysia)
13. ♂ upH speculum not extending to beyond the anterior portion of cell.
- 14(19). ♂ unF with not more than a single narrow stripe in space 1b.
- 15(16). F termen straight and slightly crenulate. ♂ F apex rather pointed. ♂ F dorsum strongly bowed, except in Celebes, where it is almost straight *E. redtenbacheri* C. & R. Felder, 1865
(Burma to Celebes and Moluccas)
16. F termen rounded and not crenulate. ♂ F apex rounded. ♂ upH speculum paler and more extensive than in *E. redtenbacheri*. ♂ F dorsum straight (*E. latifasciata*) or almost straight (*E. eboraci*).
- 17(18). F with no trace of white submarginal spotting. Up with white fasciae or unmarked. F usually >40 mm. *E. latifasciata* Weyer, 1885.
(Celebes and Moluccas)
18. UnF with white submarginal spots. F <40 mm. ♂ up dark brown, almost unmarked; superficially very like *E. modesta cerberus* Butler
E. eboraci (Grose-Smith), 1894.
(Bismarck Archipelago)
19. ♂ unF with two narrow stripes in space 1b.
- 20(21). ♂ upH vein 1 with a row of hairs directed towards the inner margin. ♂ upH with a strongly darkened triangular subternal patch. ♂ unF with a pale narrow elongate stripe in the anterior half of space 1b and a large, broad, rather oval, pale stripe, also in space 1b, extending along the anterior margin of vein 1. ♂ F dorsum straight
E. wallacei C. Felder, 1860.
(Moluccas and New Guinea)
21. ♂ upH vein 1 not hairy. ♂ unF with an elongate stripe in the anterior half of space 1b and a narrower stripe below it, these stripes pale or dark *E. batesii* C. & R. Felder, 1865.
(Moluccas to Solomon Is.)
22. ♂ upH speculum blackened and with wedge-shaped, fringed, androconial scales. ♂ unF with a long pale stripe in anterior portion of space 1b; and posterior portion of space 1b and the whole of space 1a nacreous, although vein 1 is broadly whitened and above the whitened area in space 1b is a broad blackened stripe. ♂ F dorsum bowed *E. alcatheae* (Godart), 1819.
(Moluccas to New Guinea and Australia)

Key for the separation of species of the *core* group (s.g. *Crastia* Hübner).

- 1(14). ♂ unF with whole of space 1a and at least posterior portion of space 1b pale and nacreous.
- 2(3). ♂ upH uniformly dark brown below vein 7 and subcostal vein, except for paler marginal area; no speculum. ♂ upF brand narrow and elongate, extending well beyond the origin of vein 2; brand situated within 1 mm. of vein 1. ♂ F dorsum straight *E. lacon* (Grose-Smith), 1894.
(Biak and New Britain)

3. ♂ upH with a speculum in anterior half of wing.
4(13). ♂ upH speculum not nacreous and not extending below middle of cell.
5(10). ♂ upF brand not to below origin of vein 2.
6(7). F < 45 mm. ♂ F strongly bowed, except in India, where almost straight *E. core* (Cramer), 1780.
(Ceylon to Australia and Bismarck Archipelago, excluding Formosa, Borneo, Paramalaya, Philippines and Moluccas)
7. F > 45 mm.
8(9). ♂ upF deep velvety black, unmarked. ♂ F dorsum straight
E. magou Martin, 1912
(Celebes)
9. ♂ upF and H with white submarginal spots, those on H outwardly dentate. ♂ F dorsum slightly bowed *E. dentipecta* Rothschild, 1915.
(Ceram)
10. ♂ upF brand to below origin of vein 2.
11(12). ♂ upF brand < 3 mm. broad. ♂ F dorsum bowed *E. algea* complex.
i. Philippines and Palawan. Up with white marginal and submarginal spots on both wings *E. swainsoni* (Godart), 1824.
(Philippines and Palawan)
ii. Not in Philippines. UpF almost unspotted in Malaysia, including Palawan *E. algea* (Godart), 1819.
(Sikkim to Oceania, excluding Formosa and Philippines)
12. ♂ upF brand very broad, 4-6 mm. ♂ F dorsum strongly bowed
E. nechos Mathew, 1887.
(Solomon Is.)
13. ♂ upH speculum nacreous and extending almost to median vein.
♂ upF brand elongate and lenticular and almost to below origin of vein 2. ♂ F dorsum strongly bowed *E. mitra* Moore, 1857.
(Seychelles)
14. ♂ unF whole of space 1b darkened.
15(16). ♂ upH speculum greyish-buff and without wedge-shaped fringed androconial scales. ♂ upF brand rather elongate and narrow, somewhat lenticular, and edges not clearly defined. ♂ F dorsum strongly bowed *E. tobleri* Semper, 1878.
(Philippines)
16. ♂ upH speculum blackened and with wedge-shaped, fringed, androconial scales. ♂ F dorsum bowed.
17(20). ♂ upH whole or almost whole of cell blackened.
18(19). ♂ upH blackened speculum extending to median vein. ♂ upF brand long and broad *E. boisduvalii* Lucas, 1853.
(Solomon Is., New Hebrides and Fiji Is.)
19. ♂ upH blackened speculum extending to within 2 mm. of median vein. ♂ upF brand rather elongate and narrow *E. doubledayi* complex.
i. F > 47 mm. ♀ upF with white discal spots
E. doubledayi C. & R. Felder, 1865.
(Sikkim to Malaya)
ii. F < 47 mm. Up paler and unmarked in both sexes
E. eyndhovii C. & R. Felder, 1865.
(Indo-China and Malaysia)
20. ♂ upH blackened speculum not extending beyond anterior edge of cell.
21(24). ♂ upF brand long and rather narrow, mid-way between below origin of vein 2 and termen.
22(23). Up both wings deep chocolate-brown, termens broadly paler, unmarked
E. netscheri Snellen, 1889.
(New Guinea)

23. Up both wings deep chocolate-brown, with white submarginal fasciae, divided by darkened veins *E. eurianassa* Hewitson, 1858.
(New Guinea)
24. ♂ upF brand short and lenticular and near termen, its outer edge 5 mm. from termen. UpF deep velvety brown, F and H unmarked
E. morosa Butler, 1886.
(Moluccas and New Guinea)

Key for the *sylvester* group (s.g. *Stictoploea* Butler).

- ♂ upH without an extensive buff speculum. ♂ F dorsum nearly straight *E. sylvester* (Fabricius), 1793.
(Ceylon to Australia, New Hebrides and New Caledonia)

Key for the *martinii* group.

- ♂ upH with a shining buff speculum extending from below costal nacreous area to upper portion of cell. ♂ F dorsum strongly bowed
E. martinii de Nicéville, 1893.
(Sumatra)

Key for the separation of species of the *mulciber* group (s.g. *Trepsichrois* Hübner).

- 1(2). ♂ upH with a small, pale yellow, wedge-shaped raised patch confined to, or almost confined to, anterior portion of cell. ♂ F dorsum slightly curved. ♂ upH speculum with long, club-shaped, androconial scales, with edges fringed (absent in form from Celebes).
♂ upF blue with submarginal spots; ♀ *Danaus*-like
E. mulciber (Cramer), 1777.
(South India to Philippines and Celebes)
2. ♂ upH with a narrow elongate pale yellow raised patch extending from below vein 8 to anterior portion of cell. ♂ F dorsum strongly bowed. ♂ upH speculum without long androconial scales. ♂ upF dark brown, immaculate. ♀ unknown
E. albicosta Joicey & Noakes, 1915
(Biak)

Key for the *gamelia* group (s.g. *Anadara* Moore).

- ♂ upH with a yellowish-buff lenticular raised patch confined to anterior portion of cell. ♂ upF brand short and broad, not to below origin of vein 2. UpH without white post-discal spots
E. gamelia (Hübner), 1825.
(Java)

Key for the *treitschkei* group (s.g. *Saphara* Moore).

- ♂ upH with a buff-brown raised patch not confined to cell. ♂ upF brand small, not extending to below origin of vein 2. UpH with white, post-discal spots *E. treitschkei* Boisdual, 1832.
(New Guinea to Bismarck Archipelago and New Caledonia)

Key for the separation of species of the *eleusina* group (s.g. *Selinda* Moore).

- 1(2). ♂ upF brand pale bluish-white, moderately long and narrow extending to below origin of vein 2. ♂ upH costal nacreous area extending to vein 6, often to space 5. UpF with pale bluish-white submarginal spots *E. eleusina* (Cramer), 1780.
(Java and Celebes)

2. ♂ upF brand violaceous, circular and not to below origin of vein 2, and constituting terminal spot of a post-discal fascia of interneural white spots. ♂ upH costal nacreous area to space 5
E. asyllus Godman & Salvin, 1888.
 (Solomon Is.)

Key for the *tulliolus* group (s.g. *Calliploea* Butler).

- F < 40 mm. ♂ genitalia normal *E. tulliolus* complex.
 (i) UpF apical half blue- or purple-blue-washed, with white or pale violaceous submarginal spots; no large spot at base of space 2 *E. tulliolus* (Fabricius), 1793.
 (Indo-China to Australia and New Hebrides)
 (ii) UpF blue-glossed and submarginal spots as in (i), but with a large white spot at the base of space 2
E. hewitsonii C. & R. Felder, 1865.
 (Celebes)
 (iii) UpF brown (whitish-violet in some forms), with much reduced spotting *E. stephensii* C. & R. Felder, 1865.
 (Moluccas to Bismarck Archipelago)
 (iv) UpH with large white submarginal spots or a broad white submarginal border *E. darchia* (W. S. Macleay), 1826.
 (Timor to Australia)

Key for the *phaenareta* group (s.g. *Euploea* Fabricius).

- F > 45 mm. Saccus and aedeagus remarkably short
E. phaenareta (Schaller), 1785.
 (Ceylon to Bismarck Archipelago and Solomon Is.)

***Key for the separation of species of the *midamus* group (s.g. *Salpinx* Hübner).**

- 1(6). UpF distal end of cell not whitened. ♂ F dorsum strongly bowed.
 2(3). ♂ upF brand long and narrow, with basal end almost below origin of vein 2. Clasper with distal edge excavated; aedeagus curved
E. midamus (L.), 1758.
 (North India to Philippines)
 3. ♂ upF brand shorter, broader and lenticular or rounded, with basal end far removed from below origin of vein 2. Clasper with distal edge convex.
 4(5). ♂ upF brand usually only slightly paler than the ground. Aedeagus sharply bent about one-third from distal end. UpF marginal spots always present; submarginal spots usually white, violet tinged in some races *E. klugii* Moore, 1857.
 (Ceylon to North Malaya; Hainan)
 5. ♂ upF brand pale bluish-white in western races. Aedeagus curved. UpF usually without marginal spots; pale blue submarginal spots in Indo-Malayan races *E. leucostictos* complex.
 i. UpF without an orange-brown oval patch
E. leucostictos (Gmelin), 1790.
 (Burma to New Hebrides and Fiji Is., excluding Aru Is.)
 ii. UpF with a large, orange-brown oval patch in inner area
E. usipetes Hewitson, 1858.
 (Aru Is. and New Guinea to Australia and Bismarck Archipelago)
 6. UpF with distal end of cell broadly whitened. ♂ upF brand rather short and ovate, pale blue in Indo-Malayan races. ♂ F dorsum bowed *E. diocletianus* (Fabricius), 1793.
 (Sikkim to Celebes)

NOTES ON THE GENERIC NOMENCLATURE OF THE LEPIDOPTERA RHOPALOCERA, II

By Francis HEMMING, C.M.G., C.B.E., F.R.E.S.

THE following notes have been made in the course of recent work on the generic nomenclature of the Lepidoptera Rhopalocera.

(a) Genera of which the types are here designated for the first time.

DANAIDAE.

Amaura Geyer.

Geyer, 1837, in Hübner, *Zutr. z. Samml. exot. Schmett.* 5 : 39.

Type : *Danaïs phedone* Godart, [1819].

The name *Amaura* Geyer, though available nomenclatorially, is not required since *Danaïs phedone* Godart (which is a synonym of *Papilio phaedon* Fabricius, 1798) is congeneric with *Papilio niavius* Linnaeus, 1758, the type of *Amauris* Hübner, 1816.

SATYRIDAE.

Aeropetes Billberg.

Billberg, 1820, *Enum. Ins.* : 79.

Type : *Papilio tulbaghia* Linnaeus, 1764.

This name must now replace *Meneris* Doubleday, 1844 (*List Spec. lep. Ins. B.M.* 1 : 106), of which the same species is the type.

Antirrhaea Boisduval.

Boisduval, 1870, *Consid. Lépid. Guatemala* : 61.

Type : *Papilio philoctetes* Linnaeus, 1758.

The above is the first of the two species placed in this genus by Boisduval, who expressly claimed to be its author. The name is invalid, since under Article 35 of the International Code it falls as a homonym of *Antirrhea* Hübner, [1822]. Even if this were not so, the name would not be required, since *Papilio philoctetes* Linnaeus is congeneric with *Antirrhea archaea* Hübner, [1822], the type of *Antirrhea* Hübner, [1822].

Argyronympha Mathew.

Mathew, 1886, *Proc. zool. Soc. Lond.* 1886 : 346.

Type : *Argyronympha pulchra* Mathew, 1886.

Catargynnis Röber.

Röber, 1892, in Schatz, in Staudinger & Schatz, *Exot. Schmett.* 1 (Th. 2) (6) : 284 *nota*.

and

Pseudomaniola Röber.

Röber, 1892, in Schatz, in Staudinger & Schatz, *Exot. Schmett.* 1 (Th. 2) (5) : 222.

Type : *Daedalma pholoë* Staudinger, 1887.

PROC. R. ENT. SOC. LOND. (B) 12. PT. 2. (FEB. 1943)

The above is the first of the two species placed by Röber (who designated no type) in the genus *Pseudomaniola* Röber. When later in the same year Röber realised that this name was pre-occupied by *Pseudomaniola* Weymer, 1890 (in Weymer & Maassen, in Reiss & Stübel, *Reisen Sud-Amer. Lep.* : 107), he replaced it by the name *Catargynnis* Röber but again did not designate a type. As this latter name is no more than a nom. nov. pro *Pseudomaniola* Röber, its type must be whatever species is the type of that genus. *Daedalma pholoë* Staudinger thus becomes the type of both genera.

Elymnias Hübner.

Hübner, 1818, *Zutr. z. Samml. exot. Schmett.* 1 : 12.
id., [1819], *Verz. bek. Schmett.* (3) : 37.

Type : *Elymnias jynx* Hübner, 1818.

Hitherto this genus has been regarded as having been first published by Hübner in the *Verz. bek. Schmett.*, but I have shown (Hemming, 1937, *Hübner* 2 : 185) that in fact it was first published in volume 1 of the *Zuträge*. In consequence the selection by Scudder (1875, *Proc. Amer. Acad. Arts Sci.* 10 : 162) of *Papilio lais* Cramer, [1777], as the type is invalid, that species not being cited in this genus by Hübner in the *Zuträge*.

In the *Zuträge* Hübner placed in this genus what he regarded as two species : (1) *Elymnias jynx* Hübner, which he had already named *Hamadryas jynx* (see Hemming, 1937, *Hübner* 1 : 463) and (2) *Papilio protozenia* Cramer, [1777], the first of which is here selected as the type. Although this genus was not monotypical from the standpoint of its author, Hübner did in fact only place one species in it in the *Zuträge*, since *Elymnias jynx* Hübner is a synonym of *Papilio undularis* Drury, [1773], a subspecies of *Papilio hypermnestra* Linnaeus, 1763, while *Papilio protozenia* Cramer is a synonym of nominotypical *Papilio hypermnestra* Linnaeus.

Elymniopsis Fruhstorfer.

Fruhstorfer, 1907, *Deuts. ent. Z. Iris* 20 : 171, 173-174.

Type : *Papilio phegea* Fabricius, 1793.

Eretris Thieme.

Thieme, 1905, *Berl. ent. Z.* 50 : 131.

Type : *Pronophila decorata* Felder & Felder, 1867.

Manerebia Staudinger.

Staudinger, 1897, *Deuts. ent. Z. Iris* 10 : 139-143.

Type : *Manerebia cyclopina* Staudinger, 1897.

Pieris Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (4) : 53.

Type : *Pieris dracontis* Hübner, [1819].

This is one of a considerable number of generic names originally published by other authors (in this case by Schrank) which Hübner republished in an entirely different sense. The name *Pieris* Hübner is invalid, since it is a homonym of *Pieris* Schrank, 1801 (*Fauna boica* 2 (1) : 152, 161). It does not require to be replaced, since *Pieris dracontis* Hübner is congeneric with *Papilio nereis* Drury, [1782], the type of *Pierella* Westwood, [1851].

Pseudomaniola Weymer.

Weymer, 1890, in Weymer & Maassen, in Reiss & Stübél, *Reisen Sud-Amer. Lep.* : 107.

Type : *Pseudomaniola euripides* Weymer, 1890.

Pseudosteroma Weymer.

Weymer, [1912], in Seitz, *Grossschmett. Erde* 5 (113) : 241.

Type : *Steroma pronophila* Felder & Felder, 1867.

Steremnia Thieme.

Thieme, 1905, *Berl. ent. Z.* 50 : 137.

Type : *Pedaliodes* (?) *polyxo* Godman & Salvin, 1880.

Thiemeia Weymer.

Weymer, [1912], in Seitz, *Grossschmett. Erde* 5 (131) : 267.

Type : *Pronophila phoronea* Doubleday, [1849].

AMATHUSIIDAE.

Elymnotaenaris Fruhstorfer.

Fruhstorfer, [1911], in Seitz, *Grossschmett. Erde* 9 (Exot. 101) : 411.

Type : *Morpho bioculatus* Guérin, 1829.

The name *Elymnotaenaris* Fruhstorfer is available nomenclatorially, but it is not required, since *Morpho bioculatus* Guérin is congeneric with *Taenaris nysa* Hübner, [1819], a form of *Papilio urania* Linnaeus, 1758, the type of *Taenaris* Hübner, [1819].

MORPHIDAE.

Iphimedeia Fruhstorfer.

Fruhstorfer, [1913], in Seitz, *Grossschmett. Erde* 5 (Exot. 155) : 335.

Type : *Papilio hercules* Dalman, 1823.

The name *Iphimedeia* Fruhstorfer is invalid, since under Article 35 (a) of the International Code it must be rejected as a homonym of *Iphimedia* Rathke, 1843 (*N. Act. Acad. Caes. Leop. Car.* 20 (1) : 89). It does not require to be replaced, since *Papilio hercules* Dalman is congeneric with *Papilio achilles* Linnaeus, 1758, the type of *Morpho* Fabricius, 1807.

BRASSOLIDAE.

Blepolenis Röber.

Röber, 1906, *Soc. ent.* 21 : 18.

Type : *Caligo batea* Hübner, [1821].

Though available nomenclatorially, the name *Blepolenis* Röber is not required, since *Caligo batea* Hübner is congeneric with *Opsiphanes sallei* Doubleday, [1849], the type of *Opsiphanes* Doubleday, [1849].

Caligo Boisduval.

Boisduval, 1870, *Consid. Lépid. Guatemala* : 54.

Type : *Opsiphanes sallei* Doubleday, [1849].

This name is in the same position as *Antirrhaea* Boisduval (discussed earlier

in the present paper), since in both cases Boisduval took a generic name previously published by another author and republished it as his own. The name *Caligo* Boisduval is invalid, (a) because it is a homonym of *Caligo* Hübner, [1819] (*Verz. bek. Schmett.* (4) : 51) and (b) because *Opsiphanes sallei* Doubleday is the type of *Opsiphanes* Doubleday, [1849].

Catoblepia Stichel.

Stichel, 1902, *Berl. ent. Z.* 46 : 491.

Type : *Papilio xanthus* Linnaeus, 1758.

Megastes Boisduval.

Boisduval, 1870, *Consid. Lépid. Guatemala* : 53.

Type : *Papilio darius* Fabricius, 1775.

This is another case in which Boisduval republished as his own a name previously published by another author. The name *Megastes* Boisduval is invalid, since it is a homonym of *Megastes* Westwood, [1851] (*in* Doubleday, *Gen. diurn. Lep.* (2) : 346). It does not require to be replaced, since *Papilio darius* Fabricius is congeneric with *Dynastor napoleon* Doubleday, [1849], the type of *Dynastor* Doubleday, [1849].

Pavonia Godart.

Godart, [1824], *Encyc. méth.* 9 (2) (*Ins.*) : 807.

Type : *Papilio idomeneus* Linnaeus, 1758.

The name *Pavonia* Godart is invalid, (a) because it is a homonym of (i) *Pavonia* Lamarck, 1816 (*Anim. s. vert.* 2 : 238) and (ii) of *Pavonia* Hübner, [1819] (*Verz. bek. Schmett.* (10) : 157) and (b) because *Papilio idomeneus* Linnaeus, 1758, is the type of *Aerodes* Billberg, 1820 (*Enum. Ins.* 79). The name *Aerodes* Billberg, itself, though available nomenclatorially, is not required, since *Papilio idomeneus* Linnaeus is congeneric with *Papilio eurilochus* Cramer, [1775], the type of *Caligo* Hübner, [1819].

NYMPHALIDAE.

Apatura Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 35.

Type : *Papilio bisaltide* Cramer, [1777].

This is a case in which Hübner took a name published by Fabricius and republished it in an entirely different sense. The name *Apatura* Hübner is invalid, since it is a homonym of *Apatura* Fabricius, 1807 (*Mag. f. Insektenk.* (Illiger) 6 : 280). It does not require to be replaced, since *Papilio bisaltide* Cramer is also the type of *Doleschallia* Felder & Felder, 1860.

Callidula Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (5) : 66.

Type : *Callidula pyrame* Hübner, [1819] (= *Papilio pyramus* Fabricius, 1781).

The above type designation renders *Haematera* Doubleday, [1849], an invalid name, since *Haematera thysbe* Doubleday, [1849], the type of the last-named genus, is only a subspecies of *Papilio pyramus* Fabricius, the type of *Callidula* Hübner, [1819].

Catonephele Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 40.

Type : *Catonephele eupalemaena* Hübner, [1819].

The selection of the above species as the type of this genus regularises the present position by which authors, following Scudder (1875, *Proc. Amer. Acad. Arts Sci.* 10 : 136), have treated as the type of this genus *Papilio acontius* Linnaeus, (1771), a species not cited by Hübner. This is only rendered possible by reason of the fact that *Catonephele eupalemaena* Hübner is a synonym of *Papilio acontius* Linnaeus.

Cymothoë Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 39.

Type : *Papilio althea* Cramer, [1776].

The above type designation is in accordance with the current use of this name. The original drawings from which Cramer's figures of *Papilio althea* were drawn have been carefully examined by Mr. N. D. Riley and myself and there is no doubt that those figures represent a female of *Papilio caenis* Drury, [1773].

Epicalia Doubleday.

Doubleday, 1844, *List Spec. lep. Ins. Brit. Mus.* 1 : 90.

Type : *Papilio antiochus* Linnaeus, 1775.

The name *Papilio antiochus* Linnaeus, like *Catonephele eupalemaena* Hübner, is a synonym of *Papilio acontius* Linnaeus. The name *Epicalia* Doubleday is therefore invalid, being a synonym of *Catonephele* Hübner, [1819].

Epicalia Boisduval.

Boisduval, 1870, *Consid. Lépid. Guatemala* : 40.

Type : *Papilio numilia* Cramer, [1775].

This is another case in which Boisduval took a generic name originally proposed by himself in MS., but which had first been published by another author, and claimed it as his own. The name *Epicalia* Boisduval is invalid, since it is a homonym of *Epicalia* Doubleday, 1844. It does not require to be replaced, since *Papilio numilia* Cramer is congeneric with *Catonephele eupalemaena* Hübner (= *Papilio acontius* Linnaeus), the type of *Catonephele* Hübner, [1819].

Epiphile Boisduval.

Boisduval, 1870, *Consid. Lépid. Guatemala* : 40.

Type : *Epiphile epicaste* Hewitson, [1857].

This is another case in which Boisduval's habit of using names in MS. without publishing them led to its being first published by another author (in this case also first by Doubleday). The name *Epiphile* Boisduval is invalid because it is a homonym of *Epiphile* Doubleday, 1844 (*List Spec. lep. Ins. Brit. Mus.* 1 : 90). It does not require to be replaced, since *Epiphile epicaste* Hewitson is congeneric with *Temenis oreia* Hübner, [1823], the type of *Epiphile* Doubleday.

Euptera Staudinger.

Staudinger, 1891, *Deuts. ent. Z. Iris* 4 : 98.

Type : *Euptera sirene* Staudinger, 1891.

Eurhinia Felder & Felder.

Felder & Felder, [1867], *Reise Novara Rhopal.* (3) : 405.

Type : *Papilio polynice* Cramer, [1779].

The name *Eurhinia* Felder & Felder is invalid, since it is a synonym of *Rhinopalpa* Felder & Felder, 1860 (*Wien. ent. Monats.* 4 : 399), the type of which is *Rhinopalpa fulva* Felder & Felder, 1860, a synonym of *Vanessa eudoxia* Guérin-Ménéville, 1840 (*Rev. Zool. (Soc. cuvier.)* 3 : 44), which is a subspecies of *Papilio polynice* Cramer.

Euryphura Staudinger.

Staudinger, 1891, *Deuts. ent. Z. Iris* 4 : 103.

Type : *Euryphene porphyron* Ward, 1871.

Jaera Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 38.

Type : *Papilio crithea* Drury, [1773].

The name *Jaera* Hübner is invalid, since it is a homonym of *Jaera* Leach, 1815 (*Trans. linn. Soc. Lond.* 11 : 373). It does not require to be replaced since *Papilio crithea* Drury is also the type of *Evena* Westwood, [1850], which is nomenclatorially available.

Leucosticha Rothschild & Jordan.

Rothschild & Jordan, 1903, *Novit. zool.* 10 : 538.

Type : *Papilio daedalus* Fabricius, 1775.

This name is invalid, since *Papilio daedalus* Fabricius is also the type of *Hamanumida* Hübner, [1819].

Morpho Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (4) : 49.

Type : *Morpho omphale* Hübner, [1819].

This name is invalid, since it is a homonym of *Morpho* Fabricius, 1807 (*Mag. f. Insektenk.* (Illiger) 6 : 280). It does not require to be replaced, since the type of *Morpho* Hübner is the same species as the type of *Prepona* Boisduval, [1836].

Neptis Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 42.

Type : *Papilio emilia* Cramer, [1779].

This name is invalid, since it is a homonym of *Neptis* Fabricius, 1807 (*Mag. f. Insektenk.* (Illiger) 6 : 282). It does not require to be replaced, since *Papilio emilia* Cramer is congeneric with *Olina azeca* Doubleday, [1848], the type of *Vila* Kirby, 1871.

Nessaea Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 41.

Type : *Papilio ancaea* Linnaeus, 1767.

Panopea Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (3) : 39.

Type : *Papilio semire* Cramer, [1779].

The name *Panopea* Hübner is invalid, since it is a homonym (a) of *Panopea* Menard de la C., 1807 (*Ann. Mus. Hist. nat. Paris* 9 (50-51) : 135) and (b) of

Panopea Rafinesque, 1815 (*Analyse* : 135). It does not require to be replaced, since *Papilio semire* Cramer, [1779], is congeneric with *Papilio hirce* Drury, [1782], the type of *Pseudacraea* Westwood, [1850].

Philognoma Doubleday.

Doubleday, 1844, *List Spec. lep. Ins. Brit. Mus.* 1 : 112.

Type : *Papilio decius* Cramer, [1777].

The name *Philognoma* Doubleday is invalid, since *Papilio decius* Cramer is also the type of *Palla* Hübner, [1819].

Phyllophasis Blanchard.

Blanchard, 1840, *Hist. nat. Ins.* 3 : 447.

Type : *Papilio galanthis* Cramer, [1775].

Though available nomenclatorially, the name *Phyllophasis* Blanchard is not required, since *Papilio galanthis* Cramer is congeneric with *Siderone ide* Hübner, the type of *Siderone* Hübner, [1819].

RTODINIDAE.

Agnostogyna Röber.

Röber, 1925, *Stettin. ent. Ztg* 86 : 176.

Type : *Papilio pasiphaë* Cramer, [1775].

The name *Agnostogyna* Röber is invalid, as the type is the same species as the type of *Pandemos* Hübner, [1819].

Amblygonia Felder & Felder.

Felder & Felder, [1865], *Reise Novara Rhopal.* (2) : 308.

Type : *Amblygonia amarynthina* Felder & Felder, [1865].

The name *Amblygonia* Felder & Felder is invalid, since it is a homonym of *Amblygonia* Herrich-Schäffer, [1858], *Samml. aussereurop. Schmett. Heteroc.* : 69 fig. 391 [the plate was published in 1854 but there is no legend to the plate and the name dates therefore from the text published in 1858]. The name *Amblygonia* Felder & Felder does not require to be replaced, since *Amblygonia amarynthina* Felder & Felder is also the type of *Parcella* Stichel, 1910.

Echenais Hübner.

Hübner, [1819], *Verz. bek. Schmett.* (2) : 19.

Type : *Lemonias alphaea* Hübner, [1808] (= *Papilio thelephus* Cramer, [1775]).

The only previous type-designation for this species, that by Scudder (1875, *Proc. Amer. Acad. Arts Sci.* 10 : 161) of *Echenais leucophaea* Hübner, is invalid, since that was only a manuscript name at the time of its publication in the *Verz. bek. Schmett.* and was not validly published until the appearance of pl. [13] of vol. 2 of the *Samml. exot. Schmett.* (see Hemming, 1937, *Hübner* 1 : 342, 406).

The name *Echenais* Hübner must now replace *Elaphrotis* Stichel, 1911 (*Gen. Ins.* 112 (B) : 294), of which also *Papilio thelephus* Cramer is the type.

Eurybia Oken.

Oken, 1815, *Lehrbuch Naturgesch.* 3 (Zool.) (1) : 733.

Type : *Papilio salome* Cramer, [1775].

The name *Eurybia* Oken is invalid, since it is a homonym of *Eurybia* [Illiger], 1807 (*Allgem. Lit. Ztg. Halle, [Jena]* 1807 (No. 2) : 1180). It does not require to be replaced, since *Papilio salome* Cramer is congeneric with *Limnas halimede* Hübner, [1807], the type of *Eurybia* [Illiger].

(b) A new generic name.

NYMPHALIDAE.

Childrena nom. nov. pro *Eudryas* Reuss, 1926, *Int. ent. Z.* 20 : 253.

Type : *Argynnis childreni* Gray, 1831.

The name *Eudryas* Reuss is invalid, since it is a homonym (a) of *Eudryas* Boisduval, [1836] (*Roret's Suite à Buffon (Lép.)* 1 : explic. pl. 14), (b) of *Eudryas* Harris, 1841 (*Ins. Massachusetts* : 310), (c) of *Eudryas* Fitzinger, 1843 (*Syst. Rept.* : 26), and (d) of *Eudryas* Gistel, 1848 (*Nat. Thierr.* : viii).

BOOK NOTICE.

Cotton Insects of the United States. By V. A. LITTLE and D. F. MARTIN. 4to. Minneapolis (Burgess Publishing Co.). 1942. Price \$2.25. pp. iv + 130, illust.

This book is printed in imitation typewriting by the mimeograph process. It is divided in two parts : Insects attacking squares, blooms and bolls, and Pests of the foliage, stems, and roots. The 10 chapters are each devoted to one or more pests and very full treatment is accorded. The boll weevils, for example, receive 21 pages under the headings economic importance, origin, history and present distribution, food plants, description, weevils mistaken for boll weevils, life history, hibernation, dissemination, natural control, climatic control, plant control, diseases, parasitic and predacious insects, birds, artificial control and all known methods of control including those which, having been tried, have proved unsuccessful. A list of literature is added to each chapter and a six-page, double-column, index is provided.

The book is printed on one side of the paper only. -

THE MALE OF *PSYCHODA LOBATA* TONNOIR (DIPTERA, PSYCHODIDAE)

By LI. LLOYD, D.Sc.

IN connection with a study of the insects breeding in sewage bacteria beds collections of *Psychoda* were made during the summer of 1942 in the Leeds district. All the specimens were tubed from tree-trunks in the neighbourhood of mud flats and to a less extent around cattle pastures. Apart from the common expected species, the collection includes three which Tonnoir (1940) has only recently described, viz. *P. brevicornis* 7 ♂, 4 ♀, *P. spreata* 5 ♂, 1 ♀, and *P. lobata* 7 ♂, 7 ♀. Of the last, Tonnoir used a unique female from Devon, naming as paratypes two females in the Hungarian National Museum. The opportunity is now taken to describe the male.

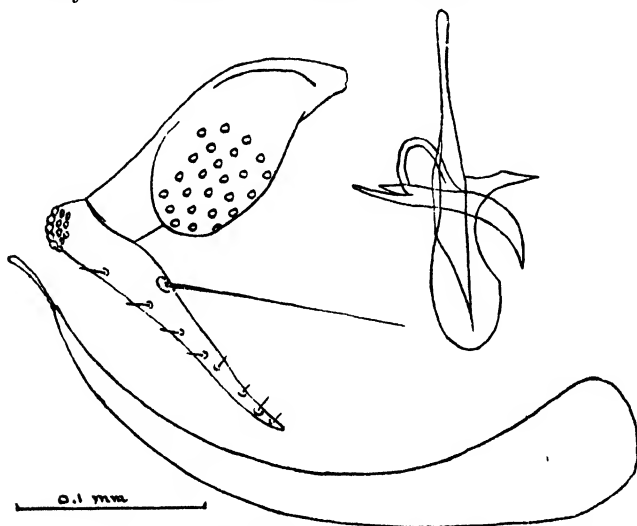


FIG. 1.—Hypopygium of *Psychoda lobata* Tonnoir.

♂. Resembling the female in general features. Hypopygium (fig. 1). Coxite stout with a large lobe bearing long setae on the inner face; style tapering and slightly undulant with a prominent setose lobe on the elbow and carrying a seta nearly as long as the style situated about one-third of the distance from the elbow. Cercopod gently tapering and of average length, retinaculum one-quarter the length of the cercopod. Aedeagus composed of a stout blunt central piece and a secondary piece shaped like an eagle's beak in ventral view and spine-like in side view, its base continuing bow-like round the base of the central piece. There are no special lobes where the aedeagus emerges from the cuticle.

Tonnoir selected the name *lobata* on account of the lobe-like shape of the subgenital plate. It will be observed that the name is equally appropriate to the male as the lobe on the coxite is its most characteristic feature.

The genitalia are described from an examination of seven males from Leeds and three from Appleby collected by the author in viii. and ix. 1942, and mounted in de Faure's fluid.

REFERENCE.

- TONNOIR, A. L., 1940, A synopsis of the British PSYCHODIDAE. *Trans. Soc. Brit. Ent.* 7, pt. 2.
PROC. R. ENT. SOC. LOND. (B) 12. PTS. 3-4. (MAY 1943.)

DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA)¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

Nazeris indicus sp. n.

Shining, black. Antennae, palpi and legs yellow. Length 5 mm.

Very near *wollastoni* Shp. Of the same colour and lustre, but with longer, thinner antennae, broader and more coarsely punctured head and thorax. Head slightly longer than broad (4:3.75), broader than the thorax, the posterior angles broadly rounded, coarsely and closely punctured. Antennae long and slender. Thorax longer than broad (3.5:3), narrowed behind, all the angles broadly rounded, along the middle with a fine keel, more coarsely punctured than the head. Elytra a little shorter (3:3.5) but as broad as the thorax, widened behind, depressed, as coarsely punctured. Abdomen gradually enlarged backwards, closely, rather coarsely punctured on the first three visible tergites, more finely on the following.

Ghum district: Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

18 **Astenus diversiventris sp. n.**

Head, elytra and last three tergites black and moderately shining, thorax duller, pitchy-black, the first three visible tergites red. Antennae yellow, the 2nd to 5th segments infusate. Legs yellow, the apices of all the femora and the anterior and middle tibiae infusate. Length 5 mm.

Only differs from *gratus* Cam. in the colour of the abdomen and legs.

♂. Unknown.

Darjeeling district: Ghum. Unique. My collection.

19 **Astenus kashmiricus sp. n.**

Black, the posterior half of the suture and the posterior margin of the elytra narrowly reddish-yellow. Antennae and legs yellow. Length 5 mm.

Near *andrewesi* Cam. but the suture is more narrowly reddish-yellow and limited to the posterior half; moreover the head is a little broader, the post-ocular region shorter and more rounded, the sculpture coarser, thorax with coarser sculpture, elytra shorter, only as long as the thorax, its sculpture and that of the abdomen scarcely differing from *andrewesi*.

♂. Unknown.

Kashmir: Gulmarg. Unique. My collection.

20 **Astenus ghumensis sp. n.**

Head and thorax rather dull ferruginous red; elytra and abdomen more shining yellowish-red, the 5th visible tergite broadly black at the base. Antennae and legs yellow. Length 4.5 mm.

A narrow elongate species, in build and antennal structure much resembling *gracilentus* Fauv. except that the elytra are shorter. Head scarcely longer than broad, as long as but a little broader than the thorax, the gently rounded post-ocular region coarctate with

¹ Continued from 1943, *Proc. R. ent. Soc. Lond.* (B) 12: 5.

the base, more than twice as long as the eye, the sculpture rather fine, of the usual reticulate-umbilicate character. Antennae moderate, not reaching the base of the thorax, all the segments longer than broad, the 11th longer than the 10th. Thorax longer than broad (2.5 : 2), oviform, the sculpture as on the head. Elytra slightly shorter and slightly narrower than the thorax, parallel, coarsely, closely and roughly punctured with short, stiff, semi-erect, yellow pubescence. Abdomen closely and rather coarsely punctured on the first three visible tergites, more superficially but scarcely less closely on the 4th and 5th, sparingly on the 6th; with short black setae and finer, sparing yellow pubescence.

♂. Unknown.

Ghum district : Mangpu. Unique. My collection.

21 *Lobochilus labralis* sp. n.

Black, shining. Antennae and legs reddish-yellow. Length 4 mm.

This is the largest of the genus known to me and the labrum is furnished with a distinct tooth on each side of the median notch, the eyes, although very large, do not occupy the whole side of the head and a short temple is present. Head slightly transverse, subquadrate, broader than the thorax, in front closely covered with larger and smaller umbilicate punctures, towards the base with small much more superficial but equally close, scarcely umbilicate punctures. Antennae as in *fortepunctatus* Cam. Thorax slightly longer than broad, the sides straight, very slightly retracted behind with a short feeble raised line before the scutellum and with close, flat superficial sculpture much finer than in *fortepunctatus*; ground sculpture absent. Elytra a little longer than the thorax (6 : 5), slightly longer than broad, moderately finely, closely punctured, much more finely than in *fortepunctatus*. Abdomen very finely, closely obsoletely punctured.

Ghum district : Rongdong Valley. Unique. My collection.

22 *Lobochilus brevipennis* sp. n.

Shining, black, the elytra dark brown with the base and apical margin narrowly and obscurely lighter. Antennae and legs reddish-yellow. Length 3 mm.

Near *fortepunctatus* Cam. with similar large eyes occupying the whole side of the head, but with shorter elytra, the head and thorax not so broad, the puncturation not quite so close or so coarse. Head broader than the thorax, coarsely and closely punctured. Antennae as in *fortepunctatus*. Thorax slightly longer than broad, with smooth median line. Elytra slightly longer (1.75 : 1.5) and slightly broader than the thorax, parallel, as closely but more finely punctured than in that species.

Ghum district : Mangpu. Unique. My collection.

23 *Lobochilus brachypterus* sp. n.

Shining black, antennae and legs reddish-yellow. Length 3 mm.

At once recognised by the elytra being shorter than the thorax. Head slightly broader than long, as broad as the thorax, subquadrate, narrower than in *fortepunctatus* Cam. The eyes very large but not occupying the whole side of the head, the temple about half as long as the eye, the puncturation not quite so coarse and not quite so close as in *fortepunctatus*, the antennae similar. Thorax as long as broad, the sides scarcely retracted behind, with narrow impunctate median line, longer and more parallel-sided, less coarsely and a little less closely punctured than in that species. Elytra shorter than the thorax (1.5 : 2),

narrower at the base, widened towards apex and there as broad as the thorax, the puncturation a little finer and less deep than in *fortepunctatus*. Abdomen extremely finely, moderately closely punctured. Ground sculpture absent on the fore-parts, very feeble on the abdomen.

♂. 6th sternite with a shallow arcuate emargination.

Ghum district : Tiger Hill, altitude 8000–10,000 feet. In moss. Type in my collection.

24 *Medon melancholicus* sp. n.

Very near *dolorosus* Cam. and *morosus* Cam. but differing from both in the following respects, the head is quadrate, as broad as long with rounded posterior angles, the eyes larger, the granules of the thorax a little coarser and not quite so close, the sculpture of the elytra is close, asperate and transversely rugulose, the base obscurely reddish. The antennae entirely ferruginous red with the first two and last two segments lighter and constructed as in *morosus*.

♂. 6th sternite broadly feebly arcuately emarginate.

Ghum district : Mangpu. Unique. My collection.

25 *Medon morosus* sp. n.

Very closely allied to *dolorosus* Cam. Similar in colour, lustre and sculpture but differs in the completely orbicular head and the slightly longer and stouter antennae which are black with the first two and the last two segments red, the intermediate segments are also longer and the penultimate less transverse. In other respects similar. Length 4.5 mm.

Ghum district : Rongdong Valley. Unique. My collection.

26 *Medon (Hypomedon) fungi* sp. n.

Head black, dull, the rest a little shining, the thorax dark reddish-brown, the elytra pitchy with reddish-yellow base, abdomen pitchy, the posterior margins of the first four visible tergites broadly reddish-yellow. Antennae and legs reddish-yellow. Length 3 mm.

Somewhat like *nigritulus* Er. in build but in all other respects different. Head as long as broad, quadrate, as broad as the thorax, the posterior angles rounded, eyes small, much shorter than the temples, densely covered with small umbilicate punctures and rugose. Antennae with the 3rd segment as long as the 2nd, 4th a little longer than broad, 5th as long as broad, 6th to 10th transverse, the penultimate about twice as broad as long. Thorax slightly longer than broad (1.75 : 1.5), the sides nearly straight, slightly retracted behind, along the middle with fine shining line, the rest of the surface closely covered with small, more or less elongate granules. Elytra as long as but broader than the thorax, as long as broad, finely, closely and roughly punctured. Abdomen extremely finely and obsoletely, moderately closely punctured. Pubescence fine, yellow, more evident on the elytra and abdomen. The specimens present no sexual characters.

Ghum district. In fungus. Type in my collection.

27 *Medon (Hypomedon) laevior* sp. n.

Black, head and thorax shining, elytra and abdomen duller, the former with the posterior margin very narrowly and obscurely yellowish. Antennae and legs reddish-yellow. Length 4 mm.

In build and colour somewhat like *obsoletus* Nord. but with more shining, narrower more obsoletely punctured head and thorax, thinner and slightly longer antennae. Head very slightly longer than broad, quadrate, slightly narrower than the thorax, the eyes small, much shorter than the temples, the posterior angle rounded; in front and on the disc with small, close, flat, very obsolete punctures, elsewhere with an extremely fine but rather close and indistinct puncturation. Antennae with the 3rd to 7th segments all longer than broad, decreasing in length, the 8th to 10th about as long as broad. Thorax scarcely longer than broad, the sides straight and slightly retracted behind, without central line, extremely finely obsoletely, moderately closely punctured. Elytra longer than the thorax (2.75 : 2), very finely, closely subasperately punctured. Abdomen extremely finely, rather closely punctured, finely and rather closely pubescent. Ground sculpture absent on the fore-parts, scarcely visible on the abdomen.

Ghum district : Mangpu. Unique. My collection.

2 ♂ *Medon (Hypomedon) ghumensis* sp. n.

Shining, head black, thorax reddish-brown, elytra reddish-yellow with the posterior half more or less infuscate; abdomen yellowish-red to reddish-brown, the 5th visible tergite sometimes infuscate. Antennae and legs reddish-yellow. Length 3.5–4 mm.

Near *singgalangensis* Cam. Very similarly coloured but narrower, more shining, the fore-parts less finely and less closely punctured, the posterior angles of the head more rounded. Head as long as broad, a little broader than the thorax, the posterior angles rounded, the eyes small: on the disc and in front with close superficial umbilicate punctures of varying size, towards the base with much smaller and more obsolete punctures and a feeble ground sculpture. Antennae with the 3rd segment longer than the 2nd, 4th and 5th about twice as long as broad, the following about as long as broad. Thorax as long as broad, the sides straight and slightly retracted behind, along the middle with a fine impunctate line, the puncturation much finer and more sparing than on the front of the head, superficial and feebly umbilicate; ground sculpture absent. Elytra a little longer than the thorax (2.5 : 2), as long as broad, finely, moderately closely punctured and without ground sculpture. Abdomen very finely, moderately closely punctured. Pubescence yellow, sparing on the head and thorax, moderately close on the elytra and abdomen.

Ghum district. Type in my collection.

2 ♀ *Charichirus immaculatus* sp. n.

Black, a little shining, the humeral angles of the elytra and posterior margins of the tergites narrowly and obscurely reddish. Antennae reddish. Legs reddish-yellow. Length 7.5 mm.

Head transverse, subquadrate, as broad as the thorax, eyes moderate, temples parallel, the posterior angles briefly rounded, along the middle of the anterior half with a more or less distinct, fine shining line, puncturation close, moderately large and umbilicate on the anterior half, towards the base smaller and more superficial and confused. Antennae rather long, the penultimate segments a little longer than broad. Thorax as long as broad, trapezoidal, along the middle with distinct raised shining line, the puncturation on the disc very like that on the front part of the head, at the sides of similar character but smaller. Elytra longer than the thorax (5 : 4), closely, rather finely asperately punctured. Abdomen extremely finely and closely punctured and pubescent, subsericeous.

♂. Unknown.

Ghum district : Rongdong Valley. Unique. My collection.

26 *Lathrobium (Lobrathium) alticola* sp. n.

Black, shining. Antennae brown. Legs pitchy, the tarsi yellow. Length 5 mm.

In colour, lustre and build (except for the shorter elytra) much resembling *filiforme* Er., but the antennae are shorter, the puncturation closer and less fine, the elytra shorter and furnished with a distinct ridge on the reflexed side. Head square, slightly broader than the thorax, the posterior angles rounded, the eyes very small, puncturation close, rather coarse and umbilicate, finer towards the base. Antennae short, the 4th segment very slightly longer than broad, 5th to 7th moniliform, 8th to 10th scarcely transverse. Thorax cylindrical, longer than broad (3 : 2.5), along the middle with narrow impunctate area, elsewhere closely punctured like the head on the disc. Elytra as long and as broad as the thorax, parallel, as closely but more coarsely punctured. Abdomen rather finely, moderately closely punctured.

. ♂. Unknown.

Kashmir : Gulmarg, altitude 8000–10,000 feet. Unique. My collection.

31 *Cryptobium brachypterum* sp. n.

Moderately shining, dark reddish-brown. Antennae and legs reddish-yellow. Length 7.75 mm.

Head similar in shape to *sikkimense* Cam. but shorter. Head as long as broad, broader than the thorax, the post-ocular region rounded and slightly dilated, the eyes rather small, the frontal region with four larger quadrately placed punctures, elsewhere with larger and smaller moderately close punctures. Antennae with the penultimate joints slightly longer than broad: thorax cylindrical, longer than broad (5 : 4), along the middle with narrow impunctate area, elsewhere with puncturation much as on the head. Elytra shorter than the thorax (4 : 5), flattened, parallel, with a fine shining keel between the upper surface and the reflexed side, the sculpture coarse, transversely rugulose. Abdomen finely and sparingly punctured. Fore-parts without, abdomen with fine coriaceous ground sculpture.

♂. 6th sternite with a nearly rectangular excision at the middle of the posterior margin : 5th truncate, the margin itself and adjacent area furnished with long black setae.

Ghum district : Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

THE *LUBENTINA* GROUP OF THE GENUS *EUTHALIA* HÜBNER
(LEPIDOPTERA : NYMPHALIDAE)

By G. TALBOT, F.R.E.S.

THE Malaysian species of the *lubentina* group of the genus *Euthalia* Hubner were partly revised by Pendlebury and Corbet (1938), who defined the characters of pattern and genitalia of the four species occurring in that subregion. Recently I have classified and arranged the whole of the material in the British Museum (Natural History), and this has provided further information concerning the group as a whole. In the present paper three new subspecies are described. The six species comprising the whole group are arranged in the following key according to their apparent relationship. This key is modified from the one given by Pendlebury and Corbet (1938).

Most of the types of forms described by Fruhstorfer should be in the Paris Museum, and it has not always been easy to determine from the description to which species some of these forms belong. The references to all names have been checked, and these are given in full as they are not available in any single work.

I am indebted to Dr. A. S. Corbet for his help with some critical points, and to the Trustees of the British Museum for facilities afforded for study.

Key to species.

Males.

- 1(6). Upperside fore-wing without white spots at cell end.
- 2(3). Upperside hind-wing without a tornal red spot *amanda*.
3. Upperside hind-wing with a tornal red spot.
- 4(5). Upperside both wings without intraneural black stripes *djata*.
5. Upperside both wings with intraneural black stripes *irrubescens*.
6. Upperside fore-wing with white spots at cell end as well as an outer series of subapical white spots.
- 7(8). Upperside fore-wing cell-spot and *dc* spot usually red, the red scaling rarely vestigial. Fore-leg reddened in continental specimens as far as northern Malaya, and in those from Philippines *lubentina*.
8. Upperside fore-wing cell-spot and *dc* spot not red or red scaling vestigial.
- 9(10). Fore-leg not reddened *whiteheadi*.
10. Fore-leg reddened *adonia*.

Females.

- 1(4). Upperside hind-wing a discal and post-discal black line enclosing a broad orange-red band (only faintly indicated in *d. djata*).
- 2(3). Upperside hind-wing a submarginal row of six red spots. *amanda*.
3. Upperside hind-wing a submarginal row of three red spots (in areas 4 to 6) *djata*.
4. Upperside hind-wing without a discal and post-discal black line, and no broad orange-red post-discal band.
- 5(10). Upperside hind-wing without a discal white band.
- 6(7). Upperside hind-wing without post-discal or submarginal spots *irrubescens*.
7. Upperside hind-wing with a post-discal and a submarginal row of spots.

- 8(9). Underside fore-wing with white post-cellular spot in area 4 touching
 de red spot. *lubentina*.
 9. Underside fore-wing with white post-cellular spot in base of area 4
 absent *whiteheadi*.
 10. Upperside hind-wing with a discal white band *adonia*.

SYSTEMATIC LIST.

(An asterisk indicates that the type is in the British Museum (N.H.).)

1. *Euthalia amanda* (Hewitson).

**Ssp. amanda* (Hewitson), 1861. Celebes.

Adolias amanda Hewitson, 1861, *Ezot. Butts.*, 2, *Adolias* pl. i, figs. 3, 4 (♂♀, Celebes). Type from Macassar.

Euthalia amanda eutaenia Fruhstorfer, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 678 (North Celebes).

Ssp. periya Fruhstorfer, 1913. Banggai.

Euthalia amanda periya Fruhstorfer, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 678 (♂♀, Bangkai).

Ssp. sulaensis subsp. n. Sula Islands.

Euthalia amabilis Staudinger, 1896 (part.), *Iris* 9 : 221 (♂ only).

♂. Upperside very similar to nominotypical form. Underside hind-wing with the post-discal row of red spots replaced by spots of the ground-colour, defined by dark edging, and placed somewhat more distad; a submarginal row of red spots as in the female of the Banggai subspecies.

Habitat.—Sula Mangoli, 2 ♂ (*Platen*).

Staudinger's description of *amabilis* includes two species. The female, being first described with reference to a good coloured figure, is here taken to be the holotype of *amabilis*. The description of the male, whose essential characters are given above, obviously indicates a form of *amanda*. The female, as the figure (t.i, fig. 6) shows, is equally clearly a form of *adonia* (Cramer).

The following considerations preclude *amabilis* from being a distinct species.

1. So far no distinct species of butterfly is known from the Sula Is. All belong to species occurring elsewhere, usually in Celebes or the Moluccas.

2. Although the nearest recorded habitat for *adonia* is Borneo and Palawan, there is nothing against it occurring on Sula. *Tanaëcia pelea* (F.) is represented on Sula by the subspecies *dohertyi* Butler, whilst it is not recorded nearer than Borneo and Palawan.

3. Three species of the *lubentina* group occur on Java. In two of these the female appears to be rare, but in the other species it is common or, perhaps, more common than the male. A collector might, therefore, obtain two females of one and a male only of each of the others. This, apparently, is what has happened in the case of *amabilis* of which 2 ♂ and 3 ♀ specimens were obtained, the true opposite sexes being absent.

2. *Euthalia djata* Distant.

**Ssp. siamica* Riley & Godfrey, 1925. Siam; Langkawi Is.

Euthalia ludonia siamica Riley & Godfrey, 1925, *Entomologist* 58 : 140 (♀, Siam : Pak Djong).

**Ssp. rubidifascia* Joicey & Talbot, 1929. Sumatra.

Euthalia djata rubidifascia Joicey & Talbot, 1929, *Bull. Hill Mus.* **3** : 79, pl. ii, fig. 2 (♀, Sumatra).

Ssp. djata Distant, 1887. North Borneo.

Euthalia djata Distant, 1887, *Ann. Mag. nat. Hist.* (5) **19** : 53 (♂♀, North Borneo).

Syn.—**Euthalia adeona* Smith & Kirby, 1884, *Rhop. Exot.* **2** : 13, *Euth.* pl. iv, figs. 5, 6 (♀) (North Borneo : Silam).

Ssp. ludonia Staudinger, 1889. Palawan.

Euthalia lubentina var. *ludonia* Staudinger, 1889, *Iris* **2** : 72-73 (♂♀, Palawan).

3. *Euthalia irrubescens* Grose-Smith.

**Ssp. irrubescens* Grose-Smith, 1893. Western and Southern China.

Euthalia irrubescens Grose-Smith, 1893, *Ann. Mag. nat. Hist.* (6) **11** : 316 (♂, Omeishan).

Euthalia irrubescens subsp., Mell, 1935, *Deutsche ent. Z.* **1935** : 241 (Kwantung, 1 ♂ seen at rest. Described as having upperside strongly metallic glossy green.)

Ssp. fulgurialis (Wilem.), 1911. Formosa.

Euripus fulgurialis Wileman, 1911, *Entomologist* **44** : 263, fig. (♀) (Formosa).

Syn.—*Euthalia irrubescens gustavi* Fruhstorfer, 1913, *Ent. Rund.* **30** : 91 (♂, Formosa).

4. *Euthalia lubentina* (Cramer).

Ssp. psittacus Fruhstorfer, 1907. Ceylon.

Euthalia lubentina psittacus Fruhstorfer, 1907, *Soc. Ent.* **21** : 52 (Ceylon).

Ssp. arasada Fruhstorfer, 1913. South India.

Euthalia lubentina arasada Fruhstorfer, 1913, in Seitz, *Gross-Schmett. Erde* **9** : 676 (Karwar).

Ssp. lubentina (Cramer), 1779. Nepal to Burma; South China; Hainan; Tonkin; Siam; Cochinchina; S.W. Yunnan.

Papilio lubentina Cramer, 1779, *Pap. Exot.* **2** : 92, pl. clv, figs. C, D (♀, China).

Dry-season form *indica* Fruhstorfer, 1904.

Euthalia lubentina indica Fruhstorfer, 1904, *Stettin. ent. Ztg.* **65** : 350 (Sikkim, Assam, Burma, Siam); *id.*, 1913, **9** : 676, t. 131a (♀).

Ssp. malaccana Fruhstorfer, 1899. Malaya.

Euthalia adonia malaccana Fruhstorfer, 1899, *Berlin. ent. Z.* **44** : 142 (♂, Malacca) (♀ = *adonia* ssp.).

Syn.—*Euthalia lubentina chersonesia* Fruhstorfer, 1904, *Stettin. ent. Ztg.* **65** : 349 (♀, Perak).

**Ssp. caudata* subsp. n.

♂. Upperside fore-wing with the post-discal four white spots placed in an oblique straight line, the spot in area 5 not placed directly under the spot in 6 as in most *lubentina* forms; subapical two spots placed farther apart than in continental subspecies; post-cellular four spots very small; white cell-bar incurved on its outer edge; a *dc* red spot. In all the foregoing characters resembles *dharma* Roep. from Java, but cell is without red scaling. Hind-wing anal lobe strongly produced, being longer than in *dharma*; markings as in *dharma*.

Underside paler brown than in the Javan form, but markings similar. Hind-wing post-discal red spots a little larger; posterior green area restricted to a marginal small patch not extended above vein 3.

Hab.—Sumatra : Palembang, 1 ♂ (ex Coll. Oberthür).

Ssp. dharma Roepke, 1938. Java.

Euthalia lubentina dharma Roepke, 1938, *Rhop. Jav.* 3 : 330, pl. 34, figs. 3 (♂), 4 (♀) (W. Java : Soekaboemi).

**Ssp. adinda* Lathy, 1913. Nias.

Euthalia adinda Lathy (March, 1913), *Entomologist* 46 : 100 (♀, Nias).

*Syn.—*Euthalia lubentina adinda* Fruhstorfer (Oct., 1913), in Seitz, *Gross-Schmett. Erde* 9 : 677 (♀, Nias).

Ssp. rajana Fruhstorfer, 1913. Banka.

Euthalia lubentina rajana Fruhstorfer, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 676 (♂♀, Banka).

Ssp. aedeonides Fruhstorfer, 1904. Borneo.

Euthalia lubentina aedeonides Fruhstorfer, 1904, *Stettin. ent. Ztg.* 65 : 351 (♀, South Borneo).

The male is apparently not known.

Ssp. philippensis Fruhstorfer, 1899. Bazilan.

Euthalia lubentina philippensis Fruhstorfer, 1899, *Berlin. ent. Z.* 44 : 141 (♂, Bazilan).

In British Museum, a female from Mindanao.

Ssp. nadenya Fruhstorfer, 1913. Luzon.

Euthalia lubentina nadenya Fruhstorfer, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 677 (♂♀, Luzon).

5. *Euthalia whiteheadi* Grose-Smith.

• *Ssp. zinara* Pendlebury & Corbet, 1938. Peninsular Siam; Malaya Hills.

Euthalia whiteheadi zinara Pendlebury & Corbet, 1938, *Journ. F.M.S. Mus.* 18 (2) : 238, fig. 3 (genit.) (♂♀, Peninsular Siam).

Ssp. mariae Fruhstorfer, 1904. Sumatra.

Euthalia lubentina mariae Fruhstorfer, 1904, *Stettin. ent. Ztg.* 65 : 348 (♂, Sumatra; Sinabong; Pad. Bovenlanden); *id.*, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 676–7 (♂♀).

**Ssp. culminicola* Fruhstorfer, 1894. Java.

Euthalia culminicola Fruhstorfer, *Ent. Nachr.* 20 : 300 (Java : ♂♀, Gedé; ♀, Tengger, East Java).

**Ssp. whiteheadi* Grose-Smith, 1889. North Borneo.

Euthalia whiteheadi Grose-Smith, 1889, *Ann. Mag. nat. Hist.* (6) 3 : 313 (♂♀, Kina Balu, North Borneo).

6. *Euthalia adonia* (Cramer).

Ssp. beata Fruhstorfer, 1905. Siam.

Euthalia adonia beata Fruhstorfer, 1905, *Int. ent. Z.* 19 : 63 (♀, Siam : Bangkok).

**Ssp. pinwilli* Pendlebury & Corbet, 1938. Malaya.

Euthalia adonia pinwilli Pendlebury & Corbet, 1938, *Journ. F.M.S. Mus.* 18 (2) : 238, fig. 2 (genit.) (♂, Malacca; ♀, Perak).

Ssp. sumatrana Fruhstorfer, 1904. Sumatra.

Euthalia adonia sumatrana Fruhstorfer, 1904, *Stettin. ent. Ztg.* 65 : 351 (♂, Sumatra : Battak); *id.*, 1913, 9 : 679 (♀, Palembang).

The male is not in the British Museum.

Ssp. adonia (Cramer), 1782. Java.

Papilio adonia Cramer, 1782, *Pap. Ezot.* 3 : 109, pl. cclv, figs. C, D (♀, Java).

Ssp. pura Fruhstorfer, 1904. Bawean.

Euthalia adonia pura Fruhstorfer, 1904, *Insektenb.* 21 : 309 (♂, Bawean); *id.*, 1913, in Seitz, *Gross-Schmett. Erde* 9 : 678, t. 131a (♂♀).

Ssp. sapitana Fruhstorfer, 1899. Lombok.

Euthalia adonia sapitana Fruhstorfer, 1899, *Berlin. ent. Z.* 44 : 145 (Sapit, Lombok).

**Ssp. kangeana* subsp. n.

♂. Resembles *montana* Fruhstorfer in the reduced red scaling of the hind-wing spots. Upside fore-wing spots small as in *montana*, but post-discal spots present in areas 2 and 3. Hind-wing post-discal band of spots less curved than in other forms, the spot in area 6 with its inner edge but slightly proximad of spot in 5, these two spots only lightly scaled red; post-discal black spots in areas 2 to 6 smaller than in *montana*, but similar to those of Javan specimens; posterior green area to vein 5 as in *pura*.

Underside fore-wing white spots prominent as in the Javan form. Hind-wing post-discal band nearly straight, its anterior spot (in 6) placed nearer margin than other spots of the band; spots in 4 to 7 lightly scaled red, those in 2 and 3 with red scaling further reduced. Ground-colour of wing olive-green, slightly more accentuated over posterior distal area.

♀. Upside bands narrower than in the Javan or Borneo forms, but wider than in *pura* from Bawean. Fore-wing spot in area 2 produced distad as in *montana*; lower two spots of the band much shorter than in Javan or Borneo specimens. Hind-wing band nearly straight, not curved on its inner edge, somewhat as in *pura* but wider.

Underside somewhat as in *pura*, the white markings larger. Hind-wing posterior green suffusion less developed than in *montana*.

Hab.—Kangean Islands, 1 ♂, 5 ♀ (received from the Zool. Mus. Buitenzorg Java).

Ssp. montana Fruhstorfer, 1899. Borneo.

Euthalia adonia montana Fruhstorfer, 1899, *Berlin. ent. Z.* 44 : 142 (♂♀, North Borneo : Kina Balu).

Ssp. princesa Fruhstorfer, 1899. Palawan.

Euthalia adonia princesa Fruhstorfer, 1899, *Berlin. ent. Z.* 44 : 142 (♀, Palawan).

Ssp. amabilis Staudinger, 1896. Sula Mangoli.

Euthalia amabilis Staudinger (part.), *Iris* 9 : 220, ♂♀, t. 1, fig. 6 (♀, Sula Mangoli). ♂ = *amanda* subsp. (q.v.).

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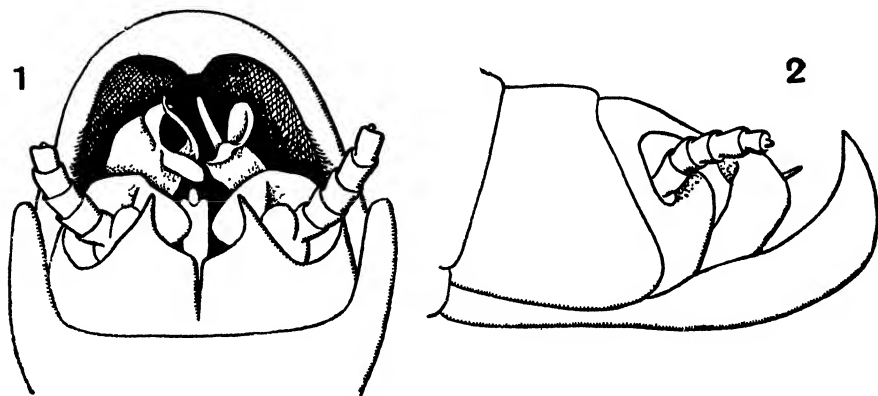
- FRUHSTORFER, F., 1913, in Seitz, *Gross Schmett. Erde* 9 : 676–679.
 MELL, R. S., 1935, "Die Euthaliini Sud- und Sudostchinas," *Deutsche ent. Z.* 1935 : 225–251.
 PENDLEBURY, H. M., and CORBET, A. S., 1938, *Journ. F.M.S. Mus.* 18 : 236–239 (four text-figures of genitalia).

RHABDIOPTERYX ANGLICA, A NEW BRITISH SPECIES OF PLECOPTERA

By D. E. KIMMINS.

(Dept. of Entomology, British Museum (Nat. Hist.).)

THIS species was originally placed on the British list under the name *Rhabdiopteryx neglecta* Albarda. The record was based on the capture of a single female at Jugger Beck, Harwood Dale, Yorks, in 1927. Lucas included it without question in his check-list of the British Plecoptera in 1932, but when Dr. Noel Hynes was working at the British Museum early in 1940 on the preparation of his keys to the British Plecoptera, we re-examined this female specimen, and on comparing it with continental examples of *R. neglecta*, it was found to differ, particularly in the form of the subgenital plate. No more material having come to hand, the species was included by Dr. Hynes in his keys with a query and a note that the specific identification was in doubt.



FIGS. 1-2.—*Rhabdiopteryx anglica* sp. n. ♂, apex of abdomen, 1, from above, 2, from side.

Thus the matter remained until the spring of 1942, when I received from Mr. Whitehead (through my colleague Mr. M. E. Mosely) two male examples of *Rhabdiopteryx* from another Yorkshire locality about ten miles distant from Jugger Beck. Examination of the male genitalia showed that the species was certainly not the true *neglecta*, but resembled Klapálek's species *R. acuminata*, described from a Finnish example. His description of the latter is written in Czech, which I cannot read, but he gives figures of the genitalia and a Latin key to the European species of *Rhabdiopteryx*. Mr. Whitehead's specimens differ in certain details from Klapálek's figures and I have decided to establish a new species based on his specimens, rather than to change a wrongly applied name for one of which the identification is only doubtfully correct.

Rhabdiopteryx anglica sp. n.

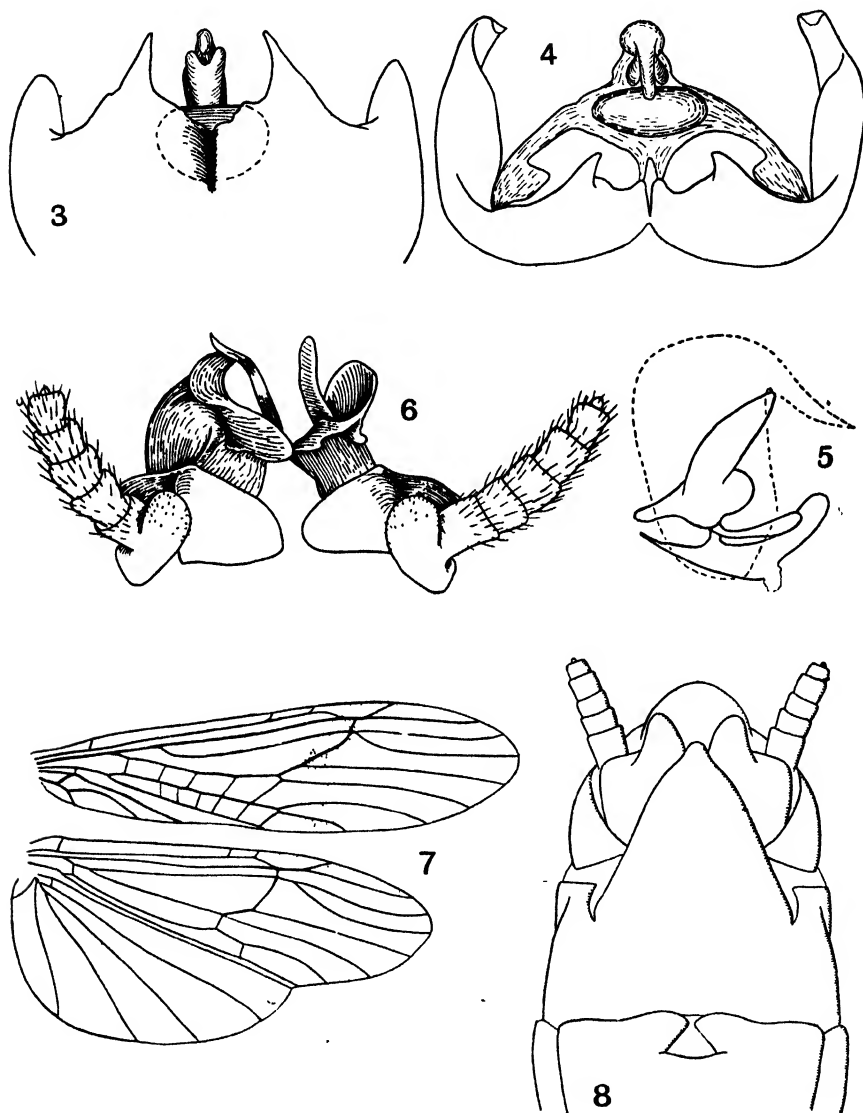
1929, *Rhabdiopteryx neglecta* Whitehead (nec Albarda) *Naturalist* 1929 : 405.

1932, *Rhabdiopteryx neglecta* Albarda, Lucas, *Entomologist* 65 : 41.

1940, *Rhabdiopteryx neglecta* Hynes, *Freshw. Biol. Ass. Sci. Publ.* 2 : 8, 9, 20, 34.

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♂. Head dark brown, antennae long, filiform, slightly paler, except the two basal segments. Pronotum pale fuscous, with darker markings, slightly wider than long, a little narrowed anteriorly. Meso- and metanotum dark brown. Abdomen dark fuscous above, paler beneath. Legs fuscous, underside of femora, and most of tibiae except apices and bases, paler. Knees noticeably darker. Wings hyaline, anterior very slightly smoky, with



FIGS. 3-8.—*Rhabdiopteryx anglica* sp. n. 3-7, ♂, 8, ♀. 3, tenth tergite and supra-anal lobe from above, 4, the same from behind, 5, the same from side, tenth tergite shown in broken line, 6, cerci and sub-anal plates from above, 7, wings, 8, apex of abdomen, ♀, from beneath.

an indistinct lunate cloud over anastomosis: venation fuscous. One additional cross-vein only between costa and subcosta in both wings. Upper branch of radial sector (R_{2+3}) not forked.

♂ genitalia:—Tenth tergite bearing two acute, somewhat downwardly directed processes. Dorsal surface between these processes depressed, apical margin excised, with a deep slit in the centre of the excision. Supra-anal lobe consisting of a pair of gently up-curved processes, the upper excised at its apex and with a large, somewhat, reniform structure placed transversely at its base. Cerci six-segmented, apical one very small. A single bulbous, membranous process at base of first segment. Sub-anal plates asymmetric, foliate, each enclosing an asymmetric upcurved spine, and with a slender digitate process at base on ventral surface, armed with a few setae. Subgenital plate (ventral plate) large, long, apex upturned and acute from side, from above extreme apex recurved and slightly truncate or excised. No ventral lobe or vesicle.

♀. General appearance as in ♂, pronotum scarcely paler than head (♀ allotype rather bleached as a result of preservation in fluid). Fore-wing with one or two, hind-wing with one additional cross-vein between costa and subcosta.

♀ genitalia:—Apical margin of seventh sternite sinuous, with an excision at its centre, the mouth of the excision almost closed by a pair of opposing triangular lobes, base of the excision slightly concave. Margin of the eighth sternite produced at its centre in a long triangular plate, somewhat contracted near its apex which reaches to the level of the base of the cerci. Sub-anal plates broad, apices produced and rounded, slightly divergent. Cerci short, cylindrical, six-segmented, apical one very small.

Length of body ♂, 9 mm., ♀, 9.5 mm. Length of fore-wing ♂, 10 mm., ♀, 11 mm.

YORKSHIRE: Pickering Beck, 28.iii., 2 ♂♂, 25.iv.1942, 1 ♀ (*H. Whitehead*); Harwood Dale, Jugger Beck, 10.iv.1927, 1 ♀ (*E. Percival*).

Type ♂, paratype ♂ from Pickering Beck, allotype ♀ from Jugger Beck in the collection of the British Museum, paratype ♀ in Mr. Whitehead's collection. Type and allotype preserved in 2% formaldehyde, genitalia and wings of paratype male mounted as microscope slides.

Mr. Whitehead writes of the type of habitat: "Both streams are about 10 ft. wide, fairly rapid, few projecting stones and plenty of alders growing along the banks. The specimens were obtained by beating these bushes. Pickering Beck is definitely a calcareous stream."

This species is most closely related to *R. acuminata* Klap. I have not seen specimens of the latter but in comparison with Klapálek's figures, the male of *R. anglica* differs in the much longer cerci, more produced apices to the lobes of the tenth tergite, and in the form of the sub-anal plates. (The supra-anal lobe is not shown in Klapálek's figures.) From *R. hamulata* Klap. it may be distinguished by the simple upper branch of the radial sector and the absence of tubercles on the apex of the subgenital plate of the male. From *R. neglecta* Alb. and *R. alpina* Kuhlreiber it may be separated by the produced apex of the subgenital plate in the male.

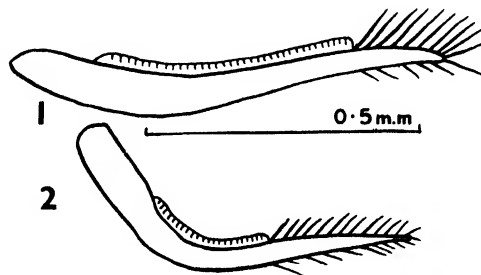
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A NEW SPECIES OF *GYMNOPOLYBIA* DUCKE (HYMEN., VESPIDAE)

By O. W. RICHARDS, M.A., D.Sc.

DUCKE (1910 : 517) erected the genus *Stelopolybia* for thirteen species, of which *Polybia infernalis* Saussure [1854] is here chosen as the type. Ducke (1914 : 317) erected another genus *Gymnopolybia* for the first ten species of *Stelopolybia* Ducke 1910 and of these *Polybia vulgaris* Ducke, 1904, is here chosen as the type. These two genera were separated from *Polybia* Lepelletier, 1836, because of the development of a prepectal furrow; there is never a trace of this in *Polybia*, though in the other two genera it is often faintly impressed and indicated mainly by the colour of the integument. The principal reason for distinguishing *Stelopolybia* from *Gymnopolybia* is because of the very different types of nest. In the former the nest hangs freely from vegetation and is surrounded by an envelope; in the latter, the very much larger nest is in a hollow tree or rock-cavity and has no envelope. In the adult insects, the



FIGS. 1-2.—1, Right fore tibial spur of *Gymnopolybia angulata* (Fab.).
2, right fore tibial spur of *Stelopolybia obidensis* (Ducke).

only differences noted by Ducke are :—*Gymnopolybia* malar space longer, eyes (especially in larger species) more hairy. These are comparative characters and would be difficult to use if the genera were much larger. The following list includes additional characters; no one of them enables a sharp separation to be made but in combination they are effective.

Gymnopolybia

Malar space longer.
Eyes more hairy.
Occipital keel distinct (weakest in *G. cayennensis* (Fab.)).
Scutellum with a marked central depression or with an impressed line (weakest in *G. cayennensis* (Fab.)).
Comb-like part of fore tibial spur much less than half as long as spur (fig. 1).
Proepisternum bordered laterally.

Stelopolybia

Malar space shorter.
Eyes less hairy.
Occipital keel very weak (even dorsally) or absent.
Scutellum with no trace of such line or depression.
Comb-like part of fore tibial spur nearly half as long as spur (fig. 2).
Proepisternum not bordered laterally.

Ducke's key to the three species of *Stelopolybia* (s.s.) is satisfactory but the key to *Gymnopolybia* is rather difficult to use, the characters being mostly

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comparative. Several structural details were overlooked. The most important of these are the following.

1. Pronotal fovea and prominence. In many VESPIDAE there is a small fovea (superficially resembling a spiracle) on the lateral aspect of the pronotum. In front of the fovea, there is often a prominence, the exact shape of which is an important character in *Gymnopolybia* (figs. 3 and 4).

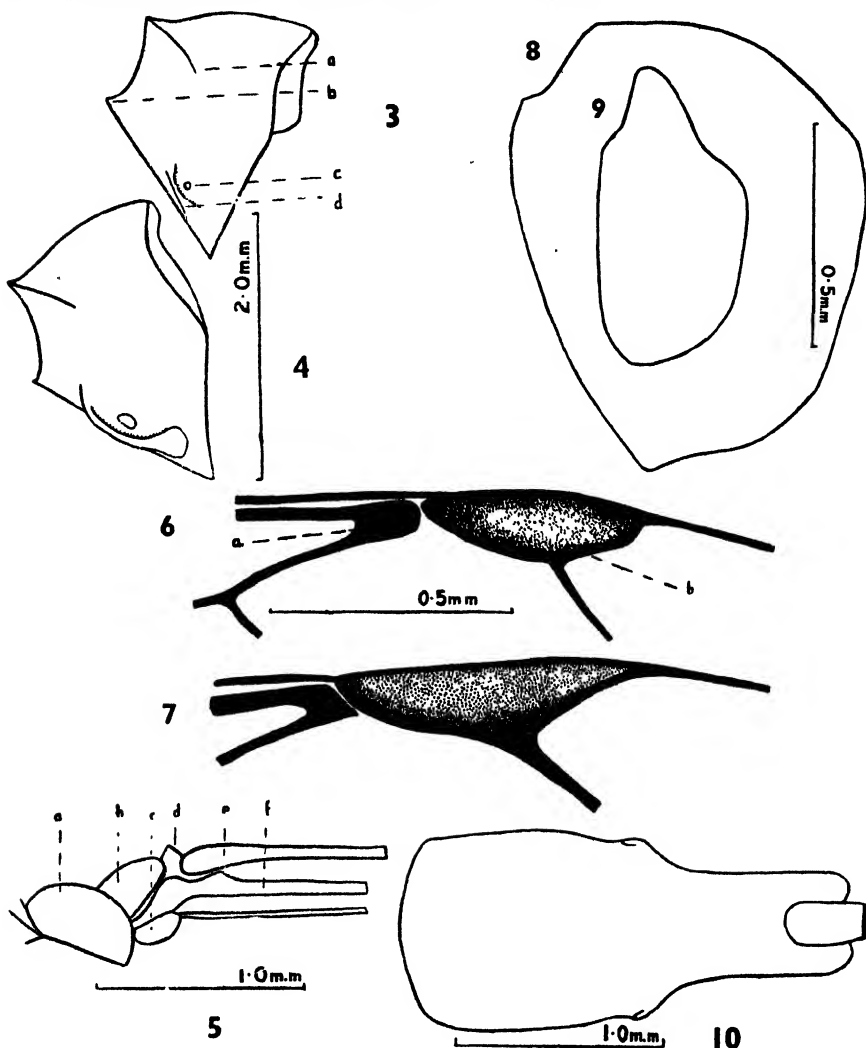


FIG. 3-10.—3, Lateral (left) view of pronotum of *G. cornelliana* sp. n.: a, pronotal keel; b, anterior margin of pronotum; c, pronotal fovea; d, prominence in front of fovea. 4, lateral (left) view of pronotum of *G. xanthopus* (Sauss.). 5, base of costa (right) of *G. vicina* (Sauss.): a, tegula; b, 1st axillary; c, 2nd axillary; d, projecting keel; e, costa; f, Sc + R + M. 6, stigmal region of right fore-wing of *G. cayennensis* (Fab.): a, parastigma; b, pterostigma. 7, stigmal region of right fore-wing of *G. angulata* (Fab.). 8, right tegula of *G. angulata* (Fab.). 9, right tegula of *G. cornelliana* sp. n. 10, first abdominal tergite of *G. cornelliana* sp. n.

2. On the ventral surface of the fore-wing, where it articulates with the first and second axillary sclerites, veins C and R + M are crossed by a strong raised keel, ending costally at the tip of the first axillary. In *G. vicina* (Sauss.), unlike all the other species, this keel is produced still further, so as to appear as a small point when the costa is examined dorsally (fig. 5).

3. The veins R + M and M in the fore-wing together form a thickening which may be termed the parastigma. This is much longer in *G. cayennensis* (Fab.) than in any of the other species (figs. 6 and 7).

4. In all species, except *G. cornelliana* sp. n., the outer margin of the tegula is regularly curved. In that species, the margin is emarginate so that the anterior corner of the tegula is acute instead of being almost a right-angle (figs. 8 and 9).

Key to the species of *Gymnopolybia* (females).

1. Pronotal keel absent. Parastigma in fore-wings elongate. Yellow and black species *G. cayennensis* (Fab.).
- Pronotal keel distinctly indicated. Parastigma in fore-wings short 2.
2. Pronotal keel very strong, forming more or less distinct lobes at sides 3.
- Pronotal keel distinct in centre but much weaker, not forming lobes at sides 6.
3. Smaller species (wing-length about 10.0 mm.). Pronotal keel less projecting laterally. Transverse keel beneath base of costa produced so as to be visible as a small point projecting beyond the costa. Mainly black species *G. vicina* (Sauss.).
- Larger species (wing-length at least 13.0 mm.). Pronotal keel much more lobate at sides. Transverse keel beneath base of costa not projecting 4.
4. Abdominal tergite 1 more than three times as long as its posterior width. Prominence in front of pronotal fovea almost obsolete dorsally, weak below. Black and whitish species *G. constructrix* (Sauss.).
- Abdominal tergite 1 barely two and one-half times as long as its posterior width. Prominence in front of pronotal fovea strong and acute dorsally 5.
5. Mainly black species (wings yellowish; antennae mainly orange; otherwise at most tibiae, tarsi and markings on scutellum, postscutellum and propodeum yellow). Lower part of prominence in front of pronotal fovea narrower *G. angulata* (Fab.).
- Mainly yellowish species with the abdomen considerably black marked. Lower part of prominence in front of pronotal fovea broader *G. testacea* (Fab.).
6. Prominence in front of pronotal fovea very strong, acute and reflexed. Sides of abdominal tergite 1 diverging to spiracles, then angled and becoming almost parallel to one another. Outer edge of tegula regularly curved. Dorsal surface of head, thorax and abdomen largely black, ventral surface (except sternites 3-6) and legs mainly testaceous *G. xanthopus* (Sauss.).
- Prominence in front of pronotal fovea weak or moderate, at most sub-acute, not reflexed 7.
7. Outer margin of tegula emarginate before anterior angle which is therefore acute. Sides of abdominal tergite 1 diverging to rather beyond the spiracles, then angled and becoming almost parallel 8.
- Outer margin of tegula regularly curved to anterior angle which is nearly a right angle. Sides of abdominal tergite 1 not angled 9.
8. Body almost entirely black, with testaceous legs *G. cornelliana* sp. n.
- Abdominal tergites 1-3 with posterior pale fasciae, sternites 1-4 testaceous var. *baezae* var. n.

9. Dorsal half of clypeus with quite numerous shallow punctures from which short bristles arise. Pronotal keel stronger, prominence in front of fovea stronger, subacute dorsally. Width of abdominal tergite 1 at posterior margin $\frac{3}{4}$ -1 of distance from spiracles to posterior margin. Size large, wing-length 13.0-14.0 mm. Testaceous and yellow species, head and thorax black marked *G. vulgaris* (Ducke).
- Dorsal half of clypeus unpunctured, with tomentum only. Pronotal keel weaker, especially at sides; prominence in front of fovea weaker, even in *G. meridionalis* (R. von Iher.) hardly subacute. Width of abdominal tergite 1 at posterior margin $\frac{1}{2}$ - $\frac{2}{3}$ distance from spiracles to posterior margin 10.
10. Pronotum with prominence in front of fovea distinctly produced in front of and dorsally to fovea. Abdominal tergite 1 about as long as in *G. pallipes* (Oliv.) but the sides a little more curved. Wing-length 10.0-11.5 mm. Species testaceous with copious black markings or black with many pale markings *G. meridionalis* (R. von Iher.).
- Pronotum with prominence not or scarcely traceable dorsally to fovea. Species testaceous and yellow with some black markings on dorsum of head, thorax and sometimes abdomen 11.
11. Abdominal tergite 1 longer and narrower, with sides almost straight. Wing-length 10.0-12.0 mm. *G. pallipes* (Oliv.).
- Abdominal tergite 1 shorter and broader, with sides distinctly curved. Wing-length 7.0-8.0 mm. *G. sulfureofasciata* (Ducke).

Gymnopolybia cornelliana sp. n.

♀. Dull black; inner and posterior margins of proepisternum, fore leg except dorsal side of femur, posterior lobes of mesosternum, mid leg except dorsal side of coxa, sclerites at top of metapleuron, hind leg except coxa and ventral shade on femur, propodeal orifice, testaceous-yellow. Sternites 1-2 brown-tinged, 2 posterolaterally narrowly yellow. Wings hyaline, costal area brownish-yellow. Length fore-wings 11.5-12.5. mean 11.9 mm.; hamuli 8-11, mean 9.6.

Clypeus with appressed tomentum on dorsal half and with sparse shallow punctures. Pronotal keel not strong, but quite distinct and sharp edged, a little convex anteriorly, not at all lobate at sides. Pronotal fovea well developed, prominence in front of it small but subacute in front of and dorsally to fovea. Scutellum with a distinctly impressed longitudinal line. Tegula (unlike all the other species) with the outer margin emarginate anteriorly, so that the anterior angle is acute. Transverse keel beneath costa strong but not projecting anteriorly. Fore-wings with parastigma hardly longer than broad. Abdominal tergite 1 (fig. 10) with sides diverging rather strongly to a little beyond the prominent spiracles, then angled and running nearly parallel to one another; posterior margin rather more than half as long as distance from spiracles to posterior margin.

Type ♀ and 19 ♀ paratypes PERU: Rio Tarna, Huacapistana, 1-2.vi.1920 (*Cornell Univ. Exped.*). The type and some paratypes are in the collection of Cornell University. Other paratypes are in the collections of the British Museum, of Dr. J. Bequaert and of myself.

The only variation observed in the above series was (a) the presence of yellow posterolateral marks on sternite 3 in one specimen, and (b) one specimen with the posterior half of the mesosternum yellow-tinged and a small yellow spot in the centre of the mesometapleural suture.

Var. *baezae* var. n.

♀. Black; ventral margin of clypeus, two lines on occiput behind eyes and ocelli, posterior margin of pronotum, two streaks on mesonotum, sclerites at wing-bases, posterior fasciae on abdominal tergites 2-4, most of sternites 1-4, legs except most of coxae, testaceous; abdominal tergites 1-2 light brown; tempora, postscutellum and propodeum with some suffused brown marks. Wings hyaline, brownish-yellow along the costa. Length fore-wings 10.0-11.0 mm., hamuli 10, 10, 11.

Type ♀ and 2 ♀ paratypes EAST ECUADOR: Baeza, iii.1915 (*purchased*). The type will be deposited in the collection of the British Museum. This variety may well prove to be a geographical subspecies.

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STETHOMEZIUM SQUAMOSUM GEN. ET SP. N. INFESTING STORED FOOD IN BRITAIN, WITH NOTES ON A SOUTH AFRICAN PTINID NOT PREVIOUSLY RECORDED IN STORED PRODUCTS (COLEOPTERA)

By H. E. HINTON, Ph.D.

(Department of Entomology, British Museum (Natural History).)

Stethomezium gen. n.

Body broadly ova and very strongly convex; head, pronotum, ventral surface, antennae, and legs densely clothed with short, stout, finely spinose, golden-testaceous hairs; elytra much less densely clothed with three kinds of hairs: (1) numerous short and stout ones; (2) a few much longer and relatively more slender hairs, and (3) short and fine hairs which are more abundant on sides than other two kinds. *Head* with eyes small, elliptical, very widely separated, and lateral. Antennae 11-segmented with basal segment stout and as long as combined length of second and third; bases narrowly separated by a median longitudinal ridge, the breadth of this ridge being equal to about a third of the length of first antennal segment. *Pronotum* strongly, evenly convex and without a basal constriction but with a deep marginal line; surface coarsely punctate and granulate. *Elytra* strongly inflated so that they are about a third broader than sternum and fused together along suture. Intervals flat except near base where first, third, fifth, and seventh are distinctly convex. Striae at most only feebly impressed, and each elytron with 10 distinct rows of punctures in addition to a very short, basal, accessory row between suture and convex part of first interval. Hind-wings absent. *Scutellum* small, inclined, on a much lower level than discal region of elytra, and not visible from above. *Prosternum* (fig. 4) very broad between coxae (about three-fourths as broad as mesosternal disk), partly concealing coxa on each side, only feebly narrowed behind, and caudal margin rounded and received into a very broad, rather shallow, arcuate emargination of anterior margin of mesosternum. Mesosternal disk about twice as broad as long, twice as broad as middle coxa, and feebly to moderately concave. Metasternal disk three times as broad as long, about a third broader than mesosternal disk, and feebly convex. Abdomen (fig. 6) with five free and externally visible sternites, the fourth being only slightly more than half as long as the third. *Legs* relatively long. Front coxae nearly as broadly separated as middle and not projecting above (when viewed ventrally) prosternum. Trochanters short and about two-thirds as broad as long, the hind trochanters only slightly longer than the middle trochanters and extending only slightly beyond inner margin of elytra. Femora feebly clavate apically. Tarsi 5-segmented with basal segment about a third longer than second.

Genotype: *Stethomezium squamosum* sp. n.

Comparative notes: *Stethomezium* is apparently more nearly related to *Mezium* Curtis than to any other known genus, but it may be distinguished from *Mezium* as follows: (1) the prosternum between the coxae is about six times as broad as the second antennal segment instead of being distinctly narrower than this segment; (2) the mesosternal disk is twice as broad as long, whereas in *Mezium* it is quadrate to distinctly longer than broad; (3) the fourth abdominal sternite is only slightly more than half as long as third, whereas in *Mezium* the third and fourth sternites are approximately equal in length or the fourth may be slightly longer than the third; and (4) the front coxae are

broadly separated and not produced above (when viewed ventrally) the level of the prosternum, whereas in *Mezium* the front coxae are contiguous or only narrowly separated and project considerably above the prosternum which is often concealed by them. The structure of the prosternum and the broadly separated front coxae will serve to distinguish *Stethomezium* from any other genus of the family.

***Stethomezium squamosum* sp. n. (figs. 1-6).**

Length, 1.8-2.8 mm.; breadth, 1.2-1.8 mm. Body broadly oval with elytra moderately strongly inflated. Cuticle strongly shining and pale to moderately dark reddish-brown; glabrous areas of pronotum usually with a distinct metallic lustre and similar areas of elytra sometimes with a feeble metallic lustre. Dorsal surface pubescent as shown in fig. 1;

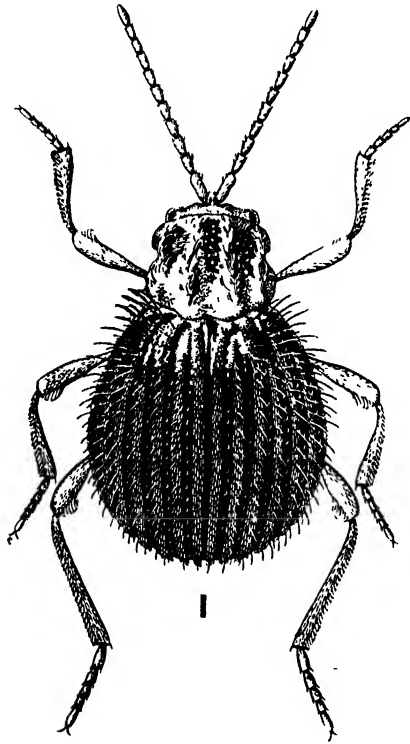
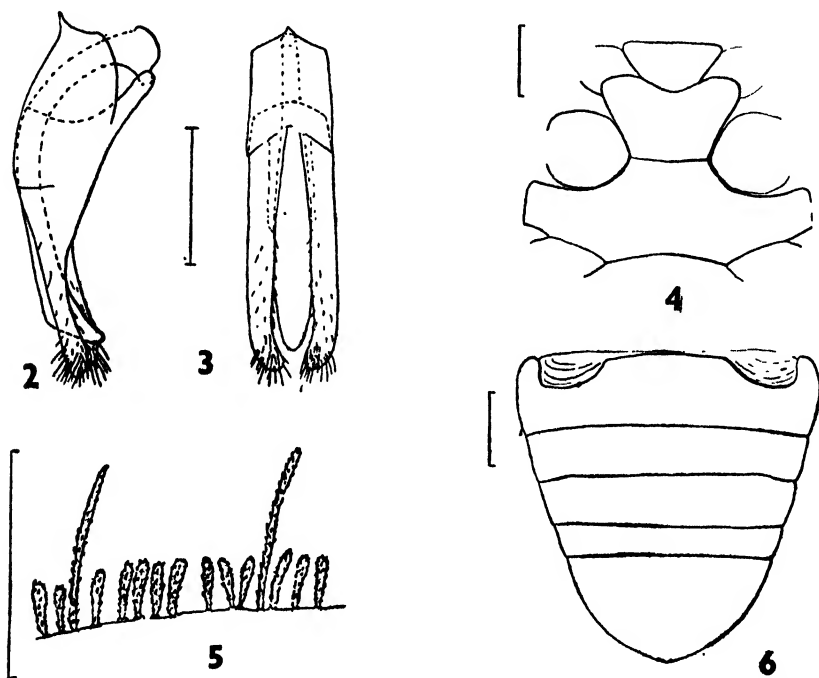


FIG. 1.—*Stethomezium squamosum* sp. n.

ventral surface everywhere clothed with recumbent to erect, stout, club-shaped, finely spinose, golden-testaceous hairs. Head with a short, prominent, median longitudinal ridge between antennae, the breadth of this ridge being equal to a third the length of the first antennal segment; anteriorly this ridge is elevated to level of clypeus, the whole of the clypeus being abruptly and noticeably elevated above the level of the front; head on each side with a deep, moderately narrow impression which extends from a point opposite antennal base to postero-dorsal margin of eye, this impression or channel becoming narrower and shallower caudally. Surface with indistinct granules which are slightly finer than

facets of eyes and are separated by one to two diameters but are much sparser on middle of front; clypeus granulate like sides of head; surface very densely clothed with short, very stout, club-shaped, finely spinose, recumbent, golden-testaceous hairs; clypeus with most short hairs erect and with a few slightly but distinctly longer hairs which are also erect. Eye more or less elliptical, about a third longer than broad, and ventral fourth often concealed by cephalic pubescence. Antenna slightly more than half as long as body, basal segment very stout and as long as combined length of second and third, second and third subequal, and other segments slightly decreasing in size towards apex but with eleventh



FIGS. 2-6.—*Stethomezium squamosum* sp. n. (2) Lateral view of right side of male genitalia. (3) Dorsal view of same. (4) Sternum of thorax. (5) Lateral view of a discal elytral interval to show two kinds of setae. (6) Sternum of abdomen. Lines next to figures refer to a length of 0.20 mm.

about a fourth longer than tenth. *Pronotum* moderately evenly convex under pubescence but with very dense pubescence forming three broad and deep longitudinal impressions as shown in fig. 1, the apical half of each of these being glabrous; each side with a broad, glabrous area extending nearly to sternum, this area being at right angles to longitudinal sublateral impression and separated from it by a high ridge of very dense pubescence; glabrous areas of disk with very deep, very coarse, round to oval punctures separated by less than one diameter to as much as two diameters; glabrous area on each side with punctures denser, often about twice as coarse, and more oval in shape; pubescent areas with dense, fine to coarse, irregularly shaped to round granules. Base and sides with a broad, very deep, and complete marginal line, this line being continued to middle three-fifths of anterior margin. *Elytra* with intervals flat or nearly so except on basal fifth or sixth where the first, third, fifth, and seventh are convex; each of these intervals becomes increasingly convex towards base so that at base each is broadly subcarinate; first seven intervals are moderately

densely clothed with short, very stout, club-shaped, finely spinose, erect, testaceous hairs and each of these intervals has a single median row of widely separated, much longer, erect hairs; near base intervals two, four, and six are very much more sparsely pubescent, whereas at base odd intervals have the short hairs much longer and denser; lateral intervals (8-10) with pubescence much sparser, finer, not club-shaped, and usually recumbent except very near apex; at extreme base ninth interval is pubescent like seventh; surface of intervals with granules which are distinctly finer than facets of eyes and are usually separated by one to four diameters. Striae only feebly impressed on basal half and absent on apical half. Each elytron with ten rows of punctures in addition to a very short basal accessory row between suture and convex part of first interval; punctures of discal striae oval, about one-fourth coarser than facets of eyes, half again to twice as long as broad, and separated longitudinally by about twice their lengths; near anterior margin of each puncture is a fine and recumbent hair which is about twice as long as puncture.

♀. Externally similar to male.

Type: ♂ in the British Museum (Nat. Hist.), London, ii.1943, in tin box containing roots of *Maerua pedunculosa* imported from South Africa in 1918 (H. E. Hinton).

Paratypes: 200 with same data as type and 200 with same data but found in a box of belladonna leaves imported from Egypt in 1917.

Other specimens: about 4000 found in the *Maerua* roots together with the type and about 500 in the box of belladonna leaves.

Many larvae and a few pupae were also found in the two commodities mentioned above. In the tin of roots the following species, listed in order of abundance, were also found: *Stegobium paniceum* L., *Anthrenus verbasci* L., *Trigonogenius globulus* Sol., *Calandra granaria* L., and *Ptinus tectus* Boield. All of these species, with the exception of the *Calandra* and the *Ptinus*, were also found breeding in the belladonna leaves.

In 1899 Péringuey (*Ann. South Afr. Mus.* 1 (2): 243) described a Ptinid, *Mezium notiale*, from Cape Colony which may prove to be identical with the new species described here. However, his description is short and vague and his type is not available to me. Furthermore, although it is evident from his description that he examined the ventral surface of his species, no mention is made of the peculiar structure of the prosternum or even of the front coxae, characters which he could hardly have overlooked had they been present in his species.

My attention was first called to this new Ptinid by four Inspectors of the Infestation Branch of the Ministry of Food, Mrs. R. E. Ewer, Miss S. Lodge, Miss P. Lowndes, and Miss C. Rawling, who had been examining the collection of stored food products in the Imperial Institute, S.W.7. I also have to thank Dr. J. R. Furlong, who kindly allowed me to retain all of the material infested by *Stethomezium*.

Mezium natalense Péringuey.

1899. *Mezium natalense* Péring., *Ann. South Afr. Mus.* 1 (2): 244, pl. 7, f. 14.

This species has not previously been recorded in stored products. In the collections of the British Museum (Nat. Hist.) there are four specimens with data as follows: 3, S. Rhodesia: Salisbury, 22.v.1922, "breeding in blood meal," and 1, Transvaal: P'chefstr'm, 6.ii.1924, "in cotton wool stoppers of bottles."

Two species of *Mezium* have previously been recorded breeding in dried

animal and vegetable products. From these *M. natalense* may be distinguished as follows :

1. Elytra with rows of punctures, with distinct but feebly impressed striae, with seven discal intervals feebly but distinctly convex at base, and without a basal collar of dense pubescence; each of seven discal intervals with a median row of stout, erect setae and each more densely setose at base. Mesosternal disk about as broad as long. Africa
Mezium natalense Péring. (1899).
- Elytra without punctures or striae and therefore without intervals; with a conspicuous basal collar of very dense pubescence; with or without longitudinal rows of stout, erect setae. Mesosternal disk distinctly longer than broad 2.
2. Pronotum with tomentum (very dense pubescence) so arranged that it appears to have a broad, shallow median sulcus and a broad, feeble gibbosity on each side on basal half. Elytra with basal tomentose collar entire on each side. Europe, N. Africa . . . *Mezium affine* Boield. (1856).
- Pronotum with tomentum so arranged that it appears to have a broad, very deep, median sulcus and a broad, very prominent gibbosity on each side on basal half. Elytra with basal tomentose collar deeply interrupted on each side. Cosmopolitan *Mezium americanum* (Lap.) (1840).

A REVISION OF THE GENUS *IXIAS* HÜBNER (LEPIDOPTERA: PIERIDAE)

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THE classification of the genus *Ixias* Hübner has hitherto presented considerable difficulty owing to the fact that types and rare specimens have been scattered among many collections.

The acquisition by the British Museum, in recent years, of many important collections has brought together more than 3000 specimens of the genus, including about 70 holotypes, allotypes and paratypes with the result that practically every known form is now represented in one collection, in many cases by considerable numbers of specimens.

Ixias is known to occur in the Andamans, Ceylon, India, Burma, Siam, Cambodia, Indo-China, China, Formosa, Hainan, the Malay Peninsula and most of the islands of the East Indies.

The examination of this considerable material has convinced the writer that several forms usually regarded as distinct species are, in reality, geographical races of a single species *pyrene* Linn.

The position appears to be that, apart from some obvious geographical differentiation, two forms occur in both sexes—those with yellow and those with white ground-colour and these two colour forms are distributed throughout the range of the *pyrene* group in a manner which is unusual so far as oriental Rhopalocera are concerned. If this colour dimorphism were confined to the female sex it would not be surprising, but such dimorphism in both sexes is rare and a dimorphism producing yellow and white males in the PIERIDAE seems to be remarkable.

If the yellow and white forms are regarded as separate species the distribution of either is unusual thus:—

Yellow form—Ceylon, India (including Burma west of the River Salween), Cochin China, Tonkin, North Annam, Hainan, China, Formosa, Malaya (south of Kedah), Java, Borneo, Mindanao.

White form—Andamans, Burma (east of the river Salween), Tenasserim, Siam to Kedah, South Annam, Sumatra.

but assuming that the two forms are geographical subspecies, it may be expected that intermediate forms will occur where the areas of the two colour forms adjoin, and there are many specimens in the British Museum from such areas with pale-yellowish ground-colour which must be regarded as intermediate between the two forms. In this connection Dr. A. S. Corbet suggests that it would be of interest if specimens were collected in Malaya between the areas occupied by the white form *verna* and the yellow form *birdi*, or at altitudes between 1000 and 3000 feet.

Some authors have regarded the size of the fore-wing subapical orange patch of the male as a character for the separation of some of the *pyrene* forms, but care is necessary in making such comparisons, as this patch varies in size according to the season, the wet-season forms showing an extension of the

brownish-black surrounding area with a corresponding decrease in size of the orange patch.

The females of *Ixias* are extremely variable in size and coloration, but the most remarkable is *undatus* which occurs in Borneo and, although the male is like a rather large *pyrene* form, the female is quite unlike any other in the genus. It bears a striking superficial resemblance to the female of *Prioneris cornelia* Voll., which also occurs in Borneo.

The difference in size between the seasonal forms is considerable, the wet-season forms sometimes having an expanse of wings from 20 to 25 millimetres greater than that of the dry-season forms.

I am indebted to Dr. A. S. Corbet for the following note on the habits of *Ixias* in Malaya :—"The white form *verna* in North Kedah occurs in secondary growth and is rather strong in flight; yellow *birdi* is confined to primary forest on the plains in Malaya proper, where it is rather slow on the wing, flies near the ground, and is more localised than is usual in Malayan Rhopalocera; white *alticola* is known only from rather open forest on Cameron Highlands and Fraser's Hill, at altitudes above 3500 feet, and is a stronger and higher flyer than *birdi*. While no case has been recorded of a species having different habits on the hills and plains in Malaya proper, there are several instances of butterflies showing different behaviour in North Kedah and Malaya proper: for instance, *Papilio coon* (F.) and *Lebadea mariha* (F.) are rather localised denizens of primary forest in the Peninsula, while they are common insects in secondary growth in North Kedah."

The genitalia of both yellow and white *pyrene* forms appear to be identical with each other and also with such *Ixias* forms as *vollenhovi* Wall., *malum-sinicum* Thieme and *flavipennis* Gr.-Sm. whose claim to specific rank can hardly be questioned.

Such similarity in genitalia, however, among allied species is by no means unusual among the PIERIDAE.

Male androconial scales are present in *Ixias*, but these do not differ from one species to another.

The early stages of the south Indian race *sesia* Fab. have been described by T. R. Bell and the larvae have been found on several species of *Capparis* (Capparidaceae), but otherwise little is known, and it is very desirable that the yellow and white forms of *pyrene* should be bred and the early stages described.

The unwisdom of using the name of a locality for a specific or form name is well illustrated by *yunnanensis* having to be used for Tonkin specimens, and *moulmeinensis* for a form which does not occur at Moulmein.

In the systematic list which follows it has been considered unnecessary to give descriptions of the commoner forms, but references are given, almost all of which have been verified, to original descriptions and to easily accessible publications, where descriptions and figures may be consulted. Other references to the literature of the genus will be found in Talbot, 1932-5, in Junk, *Lep. Cat. Pieridae*.

New names have not been proposed for seasonal or female forms as similar types of these forms tend to occur in the different subspecies, but names already available have been indicated.

Dr. A. S. Corbet has kindly examined the genitalia of many specimens, and both he and Brigadier W. H. Evans have been ever ready to place their great knowledge of the butterflies of Malaya and India respectively, at my disposal.

Ixias Hübner.

Ixias Hübner, 1819, *Verz. bek. Schm.* (6) : 95.

Type *Papilio pyrene* Linnaeus.

Ixias marianne marianne Cramer.

Papilio marianne Cramer, 1779, *Pap. Exot.* 3 : 41, pl. 217, ff. cd ♀, e ♂, Coromandel.
Thestias agnivena Moore, 1877, *Ann. Mag. nat. Hist.* (4) 20 : 50. ♂ Bombay, ♀ Mynpooree.
Ixias depalpura Butler, 1883, *Proc. zool. Soc. Lond.* 1883 : 153, pl. 24, ff. 6, 7. ♂♀, Depalpore.
Ixias cumballa Swinhoe, 1885, *Proc. zool. Soc. Lond.* 1885 : 141, pl. 9, ff. 13, 14. ♂♀, Bombay.
Ixias meridionalis Swinhoe, 1885, *Proc. zool. Soc. Lond.* 1885 : 140, pl. 9, f. 5. ♂♀, Poona.
Ixias marianne (Cramer) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9, pl. 72a, b.

Wet-season form *cumballa* Swinhoe; Intermediate form *marianne* Cramer = *meridionalis* Swinhoe; Dry-season form *agnivena* Moore = *depalpura* Butler. All three forms are figured in Seitz (*loc. cit.*) and an interesting aberration is figured by E. E. Green, 1913, *Spolia Zeyl.* 9 : pl. 2, f. 9.

The type specimens of all the above-mentioned forms are in the British Museum with the exception of *marianne*.

The male genitalia differ slightly from *pyrene*, the uncus having a small projection.

Punjab; United Provinces; Nepal; C. and S. India; Ceylon.

Ixias marianne nola Swinhoe.

Ixias nola Swinhoe, 1889, *Proc. zool. Soc. Lond.* 1889 : 399. ♂♀, Mahableshtar.
Ixias nola Swinhoe, 1910, *Lep. Ind.* 7 : 117, pl. 590, ff. a-e. ♂♀, Mahableshtar.
Ixias marianne f. nola (Swinhoe) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 160, pl. 72b. ♀, Mahableshtar.
Ixias marianne f. nola (Swinhoe) Talbot, 1939, *Fauna Brit. India Rhop.* 1 : 442. ♂♀.

Described as a separate species with seasonal forms but considered as the dry-season form of *marianne* by Fruhstorfer (*loc. cit.*) and Talbot (*loc. cit.*).

The examination of more than 50 specimens shows that *nola* is subject to considerable seasonal variation and that Swinhoe was correct in distinguishing wet- and dry-season forms. Both forms are well described and figured by Swinhoe (*loc. cit.*).

The male holotype and female allotype are in the British Museum. The male genitalia do not differ from typical *marianne*.

N. Bombay—Mahableshtar Mts.

Ixias pyrene cingalensis Moore.

Ixias cingalensis Moore, 1881, *Lep. Ceylon* 1 : 126, pl. 50, ff. 2 ♂, 2a ♀. Ceylon.
Ixias pyrene cingalensis (Moore) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159. ♂♀, Ceylon.
Ixias pyrene cingalensis (Moore) Ormiston, 1924, *Butt. Ceylon* : 92. ♂♀, Ceylon.

May be distinguished from the continental forms by the narrower fore-wing subapical band of both sexes. Two female forms may be distinguished. (1) Upperside : ground-colour greenish-yellow, fore-wing subapical band of spots greenish-yellow. (2) Upperside : ground-colour greenish-yellow, fore-wing subapical band of spots reddish-orange.

Fruhstorfer (*loc. cit.*) has described two female forms on the evidence of single specimens—*nivescens* with white ground-colour and a broad subapical band, and *connectens* with yellow ground-colour and a broad subapical band of the same colour. It is very doubtful whether these two specimens came from Ceylon as females of *cingalensis* are characterised by a narrow discontinuous fore-wing band and a yellowish ground-colour.

Ormiston, who had a long experience of collecting in Ceylon, says "the ground colour of the females is always yellow." These two females, which agree well with those of the race *sesia*, probably came from S. India.

The types of all the above-mentioned forms are in the British Museum. Ceylon.

Ixias pyrene sesia Fabricius.

Papilio sesia Fabricius, 1777, *Gen. Ins.* : 257. ♂ ("America"); S. India.

Thestias pirenassa Wallace, 1867, *Trans. ent. Soc. Lond.* (3) 4 : 395, pl. 9, f. 4. ♂♀, Madras.

Ixias frequens Butler, 1880, *Proc. zool. Soc. Lond.* 1880 : 151, pl. 15, ff. 6, 7. ♂♀, Bengal.

Ixias ganduca Moore, 1884, *J. Asiatic Soc. Beng.* 53 : 29. ♂, Calcutta.

Ixias colaba Swinhoe, 1885, *Proc. zool. Soc. Lond.* 1885 : 142, pl. 9, f. 6. ♂, Bombay.

Ixias jhoda Swinhoe, 1885, *Proc. zool. Soc. Lond.* 1885 : 142, pl. 9, ff. 3, 4. ♂♀, Bombay.

Ixias alana Swinhoe, 1890, *Ann. Mag. nat. Hist.* (6) 5 : 357. ♂♀, Maldah.

Ixias pyrene cingalensis f. *nivescens* Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 71d. ♀ ("Ceylon"); S. India.

Ixias pyrene cingalensis f. *connectens* Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 71d. ♀ ("Ceylon"); S. India.

The type of *sesia* Fabricius is still preserved in the Banks collection now in the British Museum. It is a male of the wet-season form and undoubtedly came from S. India. The locality given by Fabricius (*loc. cit.*) is, of course, erroneous.

Wet-season form *sesia* Fabricius = *frequens* Butler = *colaba* Swinhoe = *alana* Swinhoe; Intermediate form *pirenassa* Wallace; Dry-season form *ganduca* Moore = *jhoda* Swinhoe.

The females exhibit great variation particularly in the colour of the fore-wing subapical band, but three principal forms may be distinguished. ♀ f. *nivescens* Fruh. (*loc. cit.*). Upperside and underside of both wings ground-colour white; fore-wing subapical band white. ♀ f. *connectens* Fruh. (*loc. cit.*). Upperside and underside of both wings ground-colour greenish-yellow; fore-wing subapical band greenish-yellow. A third ♀ form has a greenish-yellow ground-colour and an orange fore-wing subapical band.

An extreme wet-season form occurs in Mysore in which the fore-wing subapical band is reduced in both sexes and the brownish-black surrounding area correspondingly extended. The female has a marginal band from 7 to 8 mm. in width on the hind-wing and the brownish-black area almost fills the fore-wing cell.

The type specimens of all the above-mentioned forms are in the British Museum with the exception of *ganduca*.

The early stages are described and figured by T. R. Bell, 1913, *J. Bombay nat. Hist. Soc.* 22 : 320, pl. j.

Western and Southern India.

Ixias pyrene kausala Moore.

Ixias kausala Moore, 1877, *Ann. Mag. nat. Hist.* (4) 20 : 49. ♂♀, Kausali, N.W. Himalaya.

Ixias satadra Moore, 1877, *Ann. Mag. nat. Hist.* (4) 20 : 50. ♂, Simla.

Ixias dharmasala Butler, 1880, *Proc. zool. Soc. Lond.* 1880 : 150, pl. 15, ff. 8, 9. ♂♀, Dharmasala.

Ixias wharti Butler, 1880, *Proc. zool. Soc. Lond.* 1880 : 151, pl. 15, f. 1. ♂ ("Bengal") N.W. Himalaya.

Ixias pygmaea Moore, 1882, *Proc. zool. Soc. Lond.* 1882 : 254, pl. 12, f. 1. ♂, Kangra.

Ixias satadra (Moore) Swinhoe, 1909, *Lep. Ind.* 7, pl. 580, f. 1b.

Characterised by the marginal band of the hind-wing tending to become macular in the wet and intermediate forms of both sexes.

Examination of the type of *satadra* shows it to be an extreme wet-season form with a much reduced subapical band of six well-defined reddish-orange spots on the upperside of fore-wing. It is figured by Swinhoe (*loc. cit.*).

Butler's figure of *watti* (*loc. cit.*) does not well represent the type specimen which has a much broader marginal band on the upperside of hind-wing.

Wet-season form *satadra* Moore = *watti* Butler; Intermediate form *dharm-salae* Butler; Dry-season form *kausala* Moore = *pygmaea* Moore.

The females are very variable but two forms may be distinguished. (1) Upperside: both wings ground-colour greenish-yellow; fore-wing subapical band varying from greenish-yellow to pale reddish-brown. (2) Upperside: both wings ground-colour white; fore-wing subapical band white. Both forms are heavily dusted with blackish scales.

A fine series of females in the British Museum from Miramshah, N.W. Frontier Province, collected by Lt.-Col. H. D. Peile, well illustrates the variation in colour of the fore-wing subapical band.

The types of all the above-mentioned forms are in the British Museum. Baluchistan; Chitral; N.W. Frontier Province; United Provinces.

Ixias pyrene familiaris Butler.

Ixias familiaris Butler, 1874, *Trans. ent. Soc. Lond.* 1874 : 432. ♀ ("Tibet") Sikkim.

Ixias pyrene rhexia (Fabricius) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 71b ♂, 71c ♀.

The type specimen is a female with a reduced subapical band of white spots on the upperside of the fore-wing and a hind-wing marginal band which extends to the cell.

Wet-season form *familiaris* Butler. Both sexes of the wet-season form are figured in Seitz (*loc. cit.*) under the name *rhexia*.

The contrast in size between the wet- and dry-season forms is remarkable, the average expanse of wings of the former being 80 mm. and the latter 54 mm.

Two female forms may be distinguished. (1) Upperside ground-colour white; fore-wing subapical band white. (2) Upperside ground-colour white; fore-wing subapical band varying in colour from yellow tinged with orange to bright reddish-orange.

A remarkable albino male is in the British Museum (ex Hewitson Coll.). The upperside and underside ground-colour is white dusted with black scales, and the subapical band is also white. The specimen is without locality but it probably came from Sikkim or Assam.

The name *rhexia*, used by several authors for this N. Indian race of *pyrene*, was originally given by Fabricius to a specimen of (*olotis* (*Teracolus*)) from Sierra Leone (Watkins, 1923, *Entomologist* 53 : 207).

The type specimens of both the above-mentioned forms are in the British Museum.

Nepal; Sikkim; Assam.

Ixias pyrene latifasciatus Butler.

Ixias latifasciatus Butler, 1871, *Proc. zool. Soc. Lond.* 1871 : 252. ♂ nec ♀ ("Moulmein").

Ixias moulmeinensis Moore, 1878, *Proc. zool. Soc. Lond.* 1878 : 837. ♂♀, Moulmein to Meetan.

Ixias meipona Grose-Smith, 1887, *Ann. Mag. nat. Hist.* (5) 19 : 296. ♂, Burma.

Butler described under the name *latifasciatus* a male with yellow ground-colour and a female with white ground-colour. These specimens are labelled "E. Indies, Moulmein 1843", and the female agrees well with other females from that locality. The usual form of male from Moulmein, however, has a white ground-colour and it therefore seems reasonable to assume that the male specimen described by Butler was not captured at Moulmein but somewhere to

the west of it, possibly in the Rangoon area. The name *latifasciatus* will therefore be valid for the yellow form which occurs in Burma as far east as the Karen Hills and south to Martaban and the lower Salween river.

Several authors have separated *pyrene* from southern Burma under the name *meipona*, giving as characters the pale yellow ground-colour and the restriction of the reddish-orange marking to the upper angle of fore-wing in the male, but the examination of more than one hundred specimens does not support this separation. The very slight difference in the ground-colour appears to be seasonal, the dry-season forms being sometimes a little paler, while individuals with and without the orange marking in the lower angle of fore-wing cell occur in both southern and northern Burma.

More material is desirable from extreme eastern and northern Burma, but on the available evidence it seems probable that a single subspecies inhabits the area from the Mishmi Hills and Manipur eastwards to the Karen Hills.

Wet-season form *latifasciatus* Butler; Intermediate form *meipona* Grose-Smith; Dry-season form *moulmeinensis* Moore.

The types of all the above-mentioned forms are in the British Museum. East Assam and Burma (west of the River Salween).

Ixias pyrene yunnanensis Fruhstorfer.

Ixias pyrene yunnanensis Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9: 158. ♂, Yunnan.

Ixias pyrene tonkiniana Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9: 158, f. 71c. ♂♀, Tonkin.

Ixias pyrene tonkiniana f. *denigrata* Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9: 159, f. 71e. ♂, Tonkin.

Fruhstorfer described under the name *yunnanensis* female specimens with a reddish instead of a yellowish fore-wing subapical band and a hind-wing with a reddish suffusion at its base. Examination shows that this band is by no means always reddish; in fact it varies from reddish-orange to yellowish-white and only half a dozen of the 25 females from Yunnan before me show any trace of the reddish suffusion at the base of hind-wing. The real difference between *yunnanensis* and *latifasciatus* is in the larger brownish-orange subapical fore-wing patch of the males of the former.

Specimens from Tonkin are said by Fruhstorfer (*loc. cit.*) to differ from those from Yunnan, the male having a smaller fore-wing subapical patch and very broad dark bands. The type specimen of *tonkiniana* certainly has a reduced fore-wing orange subapical patch, but examination of more than 20 males, including paratypes, shows that the type is an abnormal specimen and that the fore-wing patch is usually as large in *tonkiniana* as in *yunnanensis*. The brownish-black marginal bands are characteristic of extreme wet-season forms from both localities.

tonkiniana can be regarded as an aberration with a restricted fore-wing patch.

Wet-season form *yunnanensis* Fruh.; Dry-season form *denigrata* Fruh.

The ground-colour of the females varies from greenish-yellow to white and the subapical band on upperside of fore-wing varies in colour from reddish-orange to yellowish-white.

The types of all the above-mentioned forms are in the British Museum. Yunnan; Tonkin.

Ixias pyrene verna H. Druce.

Ixias verna H. Druce, 1874, *Proc. zool. Soc. Lond.* 1874: 108, pl. 16, ff. 5♂, 6♂. Nahcomhaisee, Siam.

Ixias pallida Moore, 1878, *Proc. zool. Soc. Lond.* 1878: 837. ♂, Moolai, Upper Tenasserim.

Ixias citrina Moore, 1878, *Proc. zool. Soc. Lond.* 1878: 837. ♂, Upper Tenasserim.

Differs from the preceding forms as follows: ♂♀. Upperside ground-colour white or tinged with yellowish-white; the subapical fore-wing patch of the male dull-orange, usually sparsely dusted with black scales; the basal area of both wings thickly dusted with blackish scales. The usual form of female has a reddish-orange subapical band on upper-side of fore-wing, but a second and apparently less common form occurs in which this band is yellowish-white.

Wet-season form *pallida* Moore; Intermediate form *verna* H. Druce = *citrina* Moore. The dry-season form has only a trace of the brownish-black marginal band on the upperside of hind-wing.

The types of the above-mentioned forms are in the British Museum.

The genitalia do not differ from the preceding *pyrene* forms.

Dr. A. S. Corbet informs me that *verna* is found in open secondary growth in North Kedah.

Burma (Dawnas); Tenasserim (east of River Salween); Siam; Malaya.

Ixias pyrene andamana Moore.

Ixias andamana Moore, 1877, *Proc. zool. Soc. Lond.* 1877 : 590. ♂♀, S. Andamans.

Ixias lena Swinhoe, 1890, *Ann. Mag. nat. Hist.* (6) 5 : 357. ♂♀, Andamans.

Ixias pyrene andamanu (Moore) Fruhstorfer, 1910, *Gross-Schmett. Erde* 9 : 159. ♂♀, Andamans.

Moore's description (*loc. cit.*) of the male gives the ground-colour of the upperside as pale primrose-yellow but examination of the type specimen shows that this yellow colour is almost imperceptible and that the true ground-colour is a dirty-white. The females appear to be much less variable than those of the preceding forms; all apparently have a fairly uniform white ground-colour and a reddish-orange fore-wing subapical band of spots.

Judging by the considerable number examined, the tendency to a primrose-yellow suffusion is more pronounced in specimens of intermediate and dry-season forms.

Fruhstorfer says (*loc. cit.*) that *lena* is an "extreme dry season form," but the type specimen is a large male (expanse of wings 69 mm.) with a marginal band on upperside of hind-wing 4 mm. in width. The true dry-season form, however, is much smaller (expanse of wings 58 mm.) with a hind-wing band 1-2 mm. in width.

All three forms are figured by Swinhoe, 1909, *Lep. Ind.* 7, pl. 586.

Wet-season form *andamana* Moore; Intermediate form *lena* Swinhoe.

The types of *andamana* and *lena* are in the British Museum.

Andaman Isles.

Ixias pyrene fruhstorferi ssp. n.

Fruhstorfer, when collecting in Annam, found that a yellow form of *pyrene* occurs in the north and white form in the south. The yellow form is very similar to *latifasciatus* Butler, but as slight differences may be discerned it may be well to distinguish it as follows.

Somewhat smaller than *latifasciatus*. ♂. Upperside: both wings ground-colour lemon-yellow; base of wings thickly dusted with blackish scales, particularly the fore-wing, which extends over the whole of the discoidal cell in some specimens; apical half of fore-wing brownish-black with a well-defined dull-orange subapical patch. The hind-wing has a brownish-black marginal band varying in width as in the other *pyrene* forms.

♀. Both wings ground-colour lemon-yellow; apical half of fore-wing and outer two-thirds of cell brownish-black; a subapical orange band. The hind-wing has a brownish-black marginal band of varying width.

The underside does not differ from *latifasciatus*.

The male may be distinguished by the more extensive dusting at the base of wings and the paler colour of the orange subapical patch. The female does not appear to differ from *latifasciatus*.

B.M. Holotype ♂ No. 15039 N. Annam, Phuc-Son, Nov.-Dec. (H. Fruhstorfer). B.M. Allotype ♀ No. 15040 N. Annam, Phuc-Son, Nov.-Dec. (H. Fruhstorfer).

Ixias pyrene annamitica Fruhstorfer.

Ixias pyrene ♀ form *annamitica* Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 72a. ♀, S. Annam.

In the southern districts of Annam a form occurs which is very similar to *verna* H. Druce, but the dull-orange patch on upperside of fore-wing in the male is larger, i.e., its outer edge is more nearly parallel to the outer margin of the wing. The name *annamitica* given by Fruhstorfer to the female may therefore be used for this "white" race of *pyrene*.

Specimens of both sexes occur with a pale yellow tinge on upperside and are probably transition forms.

The ground-colour of the type specimen, now in the British Museum, is considerably paler than the figure in Seitz (*loc. cit.*).

South Annam.

Ixias pyrene hainana Fruhstorfer.

Ixias pyrene hainana Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 158. ♂, Hainan. *Ixias pyrene hainana* f. *aest. maculosa* Joicey & Talbot, 1924, *Bull. Hill Mus.* 1 : 529. ♂♀, Interior of Hainan.

One of the largest of the *pyrene* forms, some specimens of the wet-season form having an expanse of wings of 71 mm. The subapical ochreous-yellow patch on the upperside of fore-wing in the male is also very large and extends over the apical third of the cell. The dry-season form is much smaller and has only a trace of the marginal band on hind-wing.

Intermediate form *hainana* Fruhstorfer; Dry-season form *maculosa* Joicey & Talbot.

Two female forms are known—(1) ground-colour greenish-yellow; fore-wing subapical band of the same colour; (2) ground-colour greenish-yellow, fore-wing subapical band reddish-orange.

The types of *hainana* and *maculosa* are in the British Museum. Hainan.

Ixias pyrene pyrene Linnaeus.

Papilio pyrene Linnaeus, 1764, *Mus. Lud. Utr. Reg.* : 241. ♂, S.E. China (probably Canton). *Papilio pirithous* Fabricius, 1775, *Syst. Ent.* : 483. ♀ ("America boreali"), S. China. *Papilio aenippe* Cramer, 1776, *Pap. Exot.* 2 : 13, pl. 105, ff. c, d. ♀, China. *Ixias pirithous* (Fabricius) Watkins, 1923, *Entomologist* 56 : 208. ♂♀, S. China. *Ixias pyrene pyrene* (Linnaeus) Seitz, 1910, *Gross-Schmett. Erde* 9 : pl. 71.

The type specimen of *pyrene*, a male with an expanse of wings of 66 mm., has a narrow brownish-black band on the upperside of the hind-wing and may be considered as the intermediate form.

The type specimen of *pirithous* is a female, erroneously described as from America borealis, which almost certainly came from S. China.

aenippe is, according to the figure (*loc. cit.*), a female of the intermediate form with an expanse of wings of 64 mm.

Wet-season form *pirithous* Fabricius; Intermediate form *pyrene* Linnaeus = *aenippe* Cramer. Both forms are figured in Seitz (*loc. cit.*). The dry-season form is figured under the name *aenippe*.

The ground-colour of the female varies, on the upperside, from white to pale-yellow.

The type of *pyrene* is in the collection of the Linnean Society of London and that of *pirithous* in the British Museum.

S. China.

Ixias pyrene insignis Butler.

Ixias insignis Butler, 1879, *Cist. Ent.* 2 : 431, pl. 8, f. 1. ♂, Tai-wan-foo, Formosa.

Ixias pyrene insignis f. *reducta* Paravicini, 1913, *Suppl. Ent.* 2 : 74. ♂♀, Formosa.

Ixias pyrene insignis f. *intermedia* Paravicini, 1913, *Suppl. Ent.* 2 : 74. ♂, Formosa.

Ixias splendida Swinhoe, 1916, *Ann. Mag. nat. Hist.* (8) 18 : 481. ♂, Polisha, Formosa.

Ixias pyrene insignis ab. *pallida* Nire, 1917, *Dobuts Z. Tokyo* 29 : 145. ♂, Formosa.

Ixias pyrene insignis ab. *breviptila* Sonan, 1926, *Tr. nat. Hist. Soc. Formosa* 16 : 180. ♂, Hohisha.

Ixias pyrene reducta ab. *hassenzana* Nomura, 1931, *Mushi* 4 : 10, pl. 2, f. 2. ♂, Formosa.

Ixias pyrene reducta ab. *uchidai* Tanaka, 1938, *Zephyrus* 8 : 17, pl. 16, f. 4. ♂, Formosa.

A very distinct subspecies. The male has, on the upperside, greenish-yellow ground-colour and a large reddish-orange subapical patch on the fore-wing which extends to the apical half of the cell.

The only known female form has the upperside white ground-colour thickly dusted with brownish-black scales and a white subapical band on the fore-wing.

insignis Butler is the wet-season form with broad brownish-black markings on the upperside of both wings in both sexes. Average expanse of wings 65 mm. For the intermediate form, *intermedia* Parav. may be used. It has the brownish-black marginal band on the upperside of hind-wing broken into spots. Average expanse of wings 59 mm. *reducta* Parav. = *splendida* Swinh. = *breviptila* Sonan is the dry-season form characterised by the brownish-black band along the lower margin of the orange subapical patch of the fore-wing being almost obsolete in both sexes. Average expanse of wings 56 mm.

pallida Nire appears from the description (*loc. cit.*) to be a male aberration with the ground-colour of the wings creamy and a white instead of orange fore-wing subapical patch.

uchidai Tanaka appears to be a slightly aberrant male of the dry-season form in which the outer edge of the reddish-orange subapical patch is yellowish.

hassenzana Nomura is, judging by the figure (*loc. cit.*), an aberrant male of the dry-season form with the reddish-orange subapical patch of the fore-wing dusted over with dark scales.

The types of *insignis* Butler and *splendida* Swinhoe are in the British Museum. Formosa.

Ixias pyrene salangana Fruhstorfer.

Ixias pyrene salangana Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 72c. ♂, Salanga.

Fruhstorfer's description is very brief but it is accompanied by a figure of the upperside which shows the ground-colour more strongly tinged with yellow than is the case with the actual type specimen which is now in the British Museum.

♂. Upperside : basal half of fore-wing white, thickly dusted with greyish-black scales at the base of wing; apical half of wing brownish-black with a large dull-orange subapical

patch which is also dusted with brownish-black scales. Hind-wing: ground-colour dirty-white faintly tinged with yellow; base of wing dusted with brownish-black scales; a brownish-black marginal band 5 mm. in width. Underside: both wings pale-yellow; the upperside markings faintly outlined; a brownish-black spot at tornus of the fore-wing.

♀. Unknown to me.

Salanga Id.; West coast of Malaya.

Ixias pyrene alticola Pendlebury.

Ixias ludekingi alticola Pendlebury, 1933, *Journ. F.M.S. Mus.* 17 : 383. ♂, Lubok Tamang, Pahang.

Ixias ludekingi alticola Corbet & Pendlebury, 1934, *Butt. Malay Pen.* : 102, pl. 4, ff. 40 ♂, 41 ♀.

One of the very few "white" forms of *pyrene* with the upperside ground-colour of both sexes entirely without trace of yellow scales.

The male is unusual in that the inner brownish-black border of the orange subapical band is very broad and occupies the whole costal area and apical half of the fore-wing cell.

The only known female form has the upperside ground-colour white and a fore-wing subapical band of the same colour.

The holotype male was taken at Lubong Tamang (3500 ft.) and the female allotype at Fraser's Hill (4200 ft.). Both specimens are in the British Museum.

Apparently a rare form occurring according to Corbet and Pendlebury (*loc. cit.*) "in open spaces on certain forested hills."

Pahang, F.M.S.

Ixias pyrene birdi Distant.

Ixias birdi Distant, 1883, *Ann. Mag. nat. Hist.* (5) 12 : 351. ♂, Sungei Ujong, Malaya.

Ixias birdi Distant, 1883, *Rhop. Malay.* : 309, pl. 26, f. 4. ♂, Sungei Ujong, Malaya.

Ixias pyrene birdi (Distant) Corbet & Pendlebury, 1934, *Butt. Malay Pen.* : 102. ♂♀.

The male of this very local form is distinguished by a comparatively narrow orange band and a large blackish-brown apical area on the upperside of fore-wing. The female has the ground-colour and the fore-wing subapical band pale-yellowish.

Both sexes are described by Corbet and Pendlebury (*loc. cit.*), who state that the butterfly flies in forest glades on the plains.

Malaya south of Kedah.

Ixias pyrene weelee Eecke.

Thestias weelee Van Eecke, 1912, *Notes Leiden Mus.* 34 : 80. ♀, Sabang Id.

Ixias ludekingi wahri Kalis, 1933, *Tijd. Ent.* 76 : 76. ♂♀, Sabang Id.

♂. Upperside: fore-wing; apical half brownish-black; a restricted dull-orange apical band measuring 8 mm. at its greatest width; basal half of wing white faintly tinged with yellow. Hind-wing: ground-colour white, faintly tinged with yellow; a brownish-black marginal border 5 mm. in width, narrowing somewhat towards the tornus. Base of both wings thickly dusted with black scales. Underside: fore-wing rather pale sulphur-yellow, becoming almost white towards the lower margin; a brownish-black spot at the tornus.

♀. Unknown to me, but according to the description the upperside ground-colour is yellowish-white and the fore-wing subapical band of orange-yellow is short and narrow.

wahri appears from the description to be a synonym.

A single male specimen is in the British Museum.

Sabang Id., N. of Sumatra.

Ixias pyrene ludekingii Vollenhoven.

Thestias ludekingii Vollenhoven, 1860, *Tijd. Ent.* 3 : 126. ♂, Sumatra (interior).

Ixias ludekingi (Voll.) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 72c. ♂♀.

Ixias ludekingi ab. *nigrobasalis* Joicey & Talbot, 1928, *Bull. Hill Mus.* 2 : 19. ♂, Padang Pandjang.

The fore-wing subapical band of the male is said to be reddish-orange in the original description (*loc. cit.*) and Fruhstorfer (*loc. cit.*) says it is yellowish, although in his figure the colour is orange. Examination of more than 50 specimens shows that this band is a dull-orange colour and that it varies in width from 7 to 12 mm.

The only known female form has the ground-colour and fore-wing subapical band white. It is apparently rare.

nigrobasalis Joicey & Talbot is a rather remarkable male aberration with the basal half of the fore-wing strongly dusted with blackish scales. The type specimen is in the British Museum.

Sumatra.

Ixias pyrene balice Boisduval.

Thestias balice Boisduval, 1836, *Spec. Gen. Lep.* 1 : 593. ♂, Java.

Ixias balice (Boisduval) Fruhstorfer, 1894, *Berl. ent. Z.* 39 : 246. ♀, Java.

Ixias balice (Boisduval) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 72c. ♂♀, Java.

Characterised by the absence of the brownish-black line which divides the orange subapical patch on the upperside of the fore-wing from the ground-colour in the other male forms of *pyrene*.

The female appears to be very rare and only one form is known. This has the ground-colour and the fore-wing subapical patch greenish-yellow.

Both sexes are figured in Seitz (*loc. cit.*).

Java.

Ixias pyrene clarki Avinoff.

Ixias clarki Avinoff, 1926, *Ann. Carnegie Mus.* 16 : 360, pl. 30, f. 3. ♂, Baguio, Luzon, 5000 ft.

A striking form of which only the male is known.

Upperside : fore-wing brownish-black, inner third of wing pale primrose-yellow which just enters the cell ; an orange patch centred about the lower angle of the cell and occupying almost the apical half of it. Hind-wing basal half pale primrose-yellow except the extreme base of wing which is brownish-black ; outer half of the wing brownish-black. Underside : both wings greenish-yellow ; a triangular brownish-black spot at the fore-wing tornus and a submarginal row of spots of the same colour on the hind-wing. Expanse of wings 60 to 62 mm.

Philippine Is.—Luzon and Mindanao.

Ixias undatus Butler.

Ixias undatus Butler, 1871, *Proc. zool. Soc. Lond.* 1871 : 252, pl. 19, f. 4. ♂, Labuan.

Ixias pyrene undatus (Butler) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 71b. ♂, Borneo.

Ixias pyrene undatus (Butler) Fruhstorfer, 1911, *Ent. Rundsch.* 28 : 186. ♀, Borneo.

This striking form, of which only the male was known for many years, has been considered as the Bornean race of *pyrene* by several authors. The female

is, however, quite unlike any other female in the genus, and for this reason it is given specific rank. It bears a strong superficial resemblance to the female of *Prioneris cornelia* Voll., which also occurs in Borneo.

The male holotype is in the British Museum.

Borneo.

***Ixias malumsinicum adamsi* ssp. n.**

♂. Upperside: fore-wing ground-colour brownish-black; a large discal orange marking extending from the costa to the submedian and occupying the apical third of the discoidal cell; a brownish-black marginal band which broadens towards the apex of the wing; a bluish-grey stripe between the submedian vein and the inner margin of the wing. Hind-wing: creamy-white tinged with pale yellow; a brownish-black marginal band 3 mm. in width. Underside: both wings pale greenish-yellow with numerous fine brown lines and minute spots; a dark-brown spot at the middle discocellular.

Differs from the typical form in the paler and more restricted orange marking on the upperside of the fore-wing and the yellowish hind-wing.

West Sumatra: Batang Proepoe, Padang Bovenland, 1600 ft., Sept.-Dec. 1897 (ex coll. van de Poll and coll. H. J. Adams).

B.M. ♂ holotype No. Rh. 15041.

Ixias malumsinicum malumsinicum Thieme.

Ixias malumsinicum Thieme, 1896, *Berl. ent. Z.* 41: 408. ♂, Nias.

Ixias malumsinicum (Thieme) Fruhstorfer, 1910, Seitz, *Gross-Schmetfl. Erde* 9: 159, pl. 72c. ♂♀,

The male is characterised by the size of the orange marking on the upperside which occupies the whole fore-wing except for a brownish-black marginal band and a cream-coloured stripe between the submedian vein and the inner margin.

The only known female form has a yellowish-white ground-colour and an orange subapical band on the upperside of the fore-wing.

Nias.

Ixias venilia venilia Godart.

Pieris venilia Godart, 1819, *Enc. Méth.* 9: 121. ♂♀, Java.

Ixias venilia (Godart) Fruhstorfer, 1910, Seitz, *Gross-Schmetfl. Erde* 9: 160, pl. 72d. ♂♀, Java.

Ixias venilia ♀ form *kangeanensis* Joicey & Talbot, 1928, *Bull. Hill Mus.* 2: 20. ♀, Kangean.

Ixias venilia ♀ form *piepersi* Roepke, 1935, *Rhop. Javan.*: 71, pl. 10, f. 15. ♀, Java.

Ixias venilia ♀ form *snelleni* Roepke, 1935, *Rhop. Javan.*: 71. ♀, Java.

A rather local form long thought to be confined to Java but now known to occur also in Kangean.

Female form *piepersi* Roepke (1935) does not appear to differ from female form *kangeanensis* Joicey & Talbot (1928). In any case the name is preoccupied by *Thestias* (now *Ixias*) *piepersii* Snellen (1878).

Three female forms are known:—

♀ f. typ. Upperside ground-colour yellow; fore-wing subapical band orange. ♀ f. *snelleni* Roepke (*loc. cit.*). Upperside ground-colour white; fore-wing subapical band orange. ♀ f. *kangeanensis* J. & T. Upperside ground-colour white; fore-wing subapical band white.

Type in the British Museum.

Java; Kangean.

Ixias venilia theresiae Kalis.

Ixias venilia theresiae Kalis, 1933, *Tijd. Ent.* **76** : 52. ♂, Sapoei Id.

This form is unknown to me. It has been described on the evidence of two male specimens and is said to differ from typical *venilia* in having a much reduced orange subapical patch on the upperside of the fore-wing.

Sapoei Id., Dutch E. Indies.

Ixias piepersii Snellen.

Thestias piepersii Snellen, 1878, *Tijd. Ent.* **21** : 31, pl. 2, ff. 1, 2. ♂♀, Bonthain.

Apparently very rare, being represented by only a single male specimen in the British Museum.

♂. Upperside : fore-wing greenish-yellow; base of wing, including basal half of cell, thickly dusted with bluish-grey scales; an orange patch which completely fills the apical half of the cell and extends somewhat beyond into the surrounding interspaces; a submarginal band of brownish-black spots; the outer margin of the wing has an irregular brownish-black band. Hind-wing greenish-yellow; a brownish-black marginal band 6 mm. in width, narrowing towards the tornus. Underside : both wings sulphur-yellow with the upperside dark markings indistinctly outlined.

According to the figure (*loc. cit.*) the female is brownish-black on the upperside with a fore-wing submarginal band of indistinct yellow streaks. The basal half of the hind-wing is yellow strongly dusted with brownish-black scales.

S. Celebes.

Ixias reinwardtii javanensis Kalis.

Ixias reinwardtii javanensis Kalis, 1933, *Tijd. Ent.* **76** : 67. ♂, Asembagoes, E. Java.

Unknown to me. According to the description (*loc. cit.*) the male has the upperside ground-colour white as in *baliensis* Fruh. but the orange patch on the fore-wing is as large as in *venilia* Godart. The female is similar to *baliensis* but the ground-colour of the upperside is somewhat darker; the black marking on the fore-wing cell more strongly marked; no orange marking on the fore-wing; black margins of both wings broader, especially the hind-wing. Underside not mentioned.

E. Java.

Ixias reinwardtii kangeana Fruhstorfer.

Ixias reinwardtii kangeana Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* **9** : 160, pl. 72d. ♂, Kangean.

The male differs only slightly from *lombokiana* Fruh., the orange spot on the upperside of the fore-wing being slightly more-restricted.

The female does not appear to have been described, so a description of a single female in the British Museum is given below.

Upperside : head and body black; fore-wing : ground-colour brownish-black; a dirty-white triangular area extending from the posterior margin and having its apex at the origin of the second median vein; a white submarginal spot in interspaces 2 and 3 and a very small spot in interspaces 4 and 5; a white subapical marking consisting of 5 spots; a white marking in interspace 3 at the origin of the second median vein. Hind-wing : ground-colour white, dusted with brownish-black scales especially at the base of the wing; a brownish-black spot on the middle discocellular vein; a brownish-black marginal border

6 mm. in width. Underside: both wings pale yellow with numerous minute brownish-black spots; a submarginal band of brownish-black spots. Expanse of wings 54 mm.

Similar to ♀ form *noctula* Fruh., but the pale areas on the upperside more extended.

B.M. Neallotype No. Rh. 15053.

The male holotype is in the British Museum.

Kangean.

Ixias reinwardtii baliensis Fruhstorfer.

Ixias baliensis Fruhstorfer, 1897, *Soc. Ent.* 12: 49. ♂, Bali.

Ixias pulchrior Butler, 1898, *Ann. Mag. nat. Hist.* (7) 1: 134. ♂♀, Bali.

Ixias baliensis (Fruhstorfer), Dixey, 1907, *Trans. ent. Soc. Lond.* 1906: 521, pl. 31, f. 7. ♀, Bali.

The males are somewhat larger than the other forms of *reinwardtii*, having an expanse of wings from 58 to 61 mm. The black markings beyond the cell on the upperside of the fore-wing are less strongly indicated. Four female forms are represented in the British Museum. (1) ♀ f. *pulchrior* Butler (*loc. cit.*). Upperside: ground-colour white; fore-wing subapical band orange. (2) Upperside: ground-colour and the fore-wing subapical band white. This form is figured by Dixey (*loc. cit.*), who discusses its strong resemblance to the female of *Cepora corva* Wall. (3) Upperside: ground-colour white; fore-wing subapical band primrose-yellow. (4) Upperside: ground-colour greenish-yellow; fore-wing subapical band orange.

The type specimens of *baliensis* and *pulchrior* are in the British Museum. Bali.

Ixias reinwardtii lombokiana Fruhstorfer.

Ixias reinwardtii lombokiana Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9: 160, pl. 72e. ♂♀, Lombok.

Ixias reinwardtii lombokiana ♀ form *noctula* Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9: 160, pl. 72e. ♀, Lombok.

Hardly differs from *baliensis*. The males from Bali and Lombok vary individually and the characters given by Fruhstorfer (*loc. cit.*) do not hold when a series is examined. The males of *lombokiana* are, however, somewhat smaller and the dark markings on the upperside are, on the whole, more pronounced.

Three female forms may be distinguished.

(1) ♀ f. *typ.* Upperside: ground-colour, fore-wing subapical band and the submarginal spots all yellow (fig. in Seitz (*loc. cit.*)). (2) ♀ f. *noctula* Fruh. Upperside almost entirely black (fig. in Seitz (*loc. cit.*)). An extreme wet-season form. (3) ♀ f. Upperside: ground-colour white; fore-wing subapical band and the submarginal spots white.

These female forms are very similar to those occurring on the islands Flores, Sumbawa, Alor and Timor, but in view of the differences in the males they may be regarded as distinct subspecies.

The type specimens of both *lombokiana* and *noctula* are in the British Museum.

Lombok.

Ixias reinwardtii extincta Röber.

Ixias reinwardtii var. *extincta* Röber, 1900, *Ent. Nachr.* 26: 200. ♂♀, Sumba.

Ixias reinwardtii pagenstecheri Fruhstorfer (*nec* Röber), 1910, Seitz, *Gross-Schmett. Erde* 9: 160. ♀, Sumba.

Both sexes of *extincta* are said by Röber (*loc. cit.*) to be smaller than typical *reinwardtii*, but the examination of a series does not support this difference, the males being similar to those of typical *reinwardtii*.

The only known female form has the upperside ground-colour and the fore-wing subapical band of spots white. The spots composing this band are longer than in the other female forms of *reinwardtii*.

Fruhstorfer (*loc. cit.*) uses the name *pagenstecheri* Röber for this form, but the reference given proves to be a description of *Cepora* (*Pieris*) *pagenstecheri* Röber and I am unable to discover that Röber described an *Ixias* under that name.

Sumba.

Ixias reinwardtii reinwardtii Vollenhoven.

Thestias reinwardtii Vollenhoven, 1860, *Tijd. Ent.* 3 : 126. ♂ ("Moluccas").

Ixias reinwardtii reinwardtii (Vollenhoven) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 160, pl. 72e. ♂♀.

The underside of the hind-wing of the male is usually paler than in the other forms of *reinwardtii*. Three female forms may be distinguished. (1) Similar to ♀ *f. noctula*, but the white markings are more pronounced on the upperside. (2) Upperside : ground-colour and fore-wing subapical band of spots white. (3) Upperside : ground-colour and fore-wing subapical band of spots greenish-yellow.

The male and the second female form are figured in Seitz (*loc. cit.*).

Sumbawa; Flores; Adonara; Alor; Timor.

Ixias paluensis Martin.

Ixias paluensis Martin, 1914, *Deuts. Ent. Z. Iris* 28 : 68. ♂♀, Paloe, Celebes.

Ixias paluensis Martin, 1920, *Deuts. Ent. Z. Iris* 34 : 185. ♂♀, Paloe, Celebes.

♂. Upperside : fore-wing; base of wing and basal half of cell bluish-grey; apical two-thirds of wing and apical half of the cell dark-brown; a small brownish-orange marking at the apex of the cell; a row of five elongated white spots in the interspaces beyond the apex of the cell; a submarginal band of elongated white markings in the interspaces 1a and 1b. Hind-wing; base of wing bluish-grey; disc of wing white; a dark-brown marginal band 9 mm. in width. Underside : both wings yellow; a small brownish-black spot at the middle discocellular; a brownish-black marking at the tornus of the fore-wing. ♀. Upperside : fore-wing dark-brown; a row of four elongated white markings in the interspaces beyond the cell; a submarginal row of five indistinct white spots; a white marking at the lower margin of the wing 5 mm. long extending into interspace 1b. Hind-wing; basal half white dusted with dark-brown scales; outer half of wing dark-brown. Underside : both wings brownish-yellow with numerous dark-brown minute spots and lines; a submarginal row of dark-brown spots; a small dark-brown spot at the middle discocellular; a large dark-brown marking at the tornus of the fore-wing. Expanse of wings ♂ and ♀ 60-65 mm.

The early stages are fully described by Dr. L. Martin, 1912, *Deuts. Ent. Z. Iris* 26 : 191-196.

Paloe, Celebes.

Ixias vollenhovii Wallace.

Thestias vollenhovii Wallace, 1867, *Trans. ent. Soc. Lond.* (3) 4 : 393. ♂, Timor.

Thestias venatrix Wallace, 1867, *Trans. ent. Soc. Lond.* (3) 4 : 393. ♂ ("Moulmein") Timor.

Ixias venatrix (Wallace) Butler, 1871, *Proc. zool. Soc. Lond.* 1871 : 254, pl. 19, f. 1. ♂, Timor.

Ixias vollenhovii (Wallace) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 160, pl. 72d. ♂, Timor.

The type specimen of *vollenhovii* is a male (expanse of wings 59 mm.) with strongly marked brownish-black bands on the upperside of the fore-wing; the ground-colour of the underside is yellow.

The type of *venatrix* is also a male (expanse of wings 50 mm.) with much

narrower brownish-black bands on the upperside of the fore-wing : the ground-colour of the underside is much paler than in *vollenhovii*.

Only one female form is known. This has the upperside ground-colour greenish-yellow and the fore-wing subapical band of spots reddish-orange. The differences between the wet- and dry-season forms are the same in both sexes.

Wet-season form *vollenhovii* Wallace; Dry-season form *venatrix* Wallace. The type specimens of both forms are in the British Museum.

Timor; Wetter; Roma; Letti; Moa; Kisser.

Ixias kühni Röber.

Ixias kühni Röber, 1891, *Tijds. Ent.* 34 : 287; fig. in vol. 35, pl. 4, ff. 3, 4. ♂♀, Wetter.

Ixias kuehni (Röber) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 160, pl. 72d, ♂; pl. 73a, ♀, Wetter.

Apparently a very local form which occurs only on Wetter Id. A single male specimen in the British Museum labelled Kisser (ex coll. Fruhstorfer) may be an error, as Fruhstorfer (*loc. cit.*) does not mention this locality.

Both sexes are figured in Seitz (*loc. cit.*), whose figure of the female shows a form with a more restricted fore-wing subapical band of spots than any in the British Museum collection.

Two female forms are known.

(1) Upperside ground-colour white; fore-wing subapical band reddish-orange. (2) Upperside ground-colour greenish-yellow; fore-wing subapical band reddish-orange.

Wetter Id. (Kisser?).

Ixias flavipennis Grose-Smith.

Ixias flavipennis Grose-Smith, 1885, Forbes, *Nat. Wanderings Sumatra* : 275. ♂, Mt. Dempo, Sumatra, 4000 ft.

Ixias pyritis Weymer, 1887, *Stettin. ent. Ztg.* 48 : 13 pl. 1, f. 4. ♂, Padang, W. Sumatra.

Ixias flavipennis (Grose-Smith) Fruhstorfer, 1910, Seitz, *Gross-Schmett. Erde* 9 : 159, pl. 72b, ♂, 72d. ♀, Sumatra.

A very distinct species which appears to occur only at higher elevations. The sexes are strikingly different, the male having both wings golden-yellow on the upperside with black margins, while the female has both wings white with brownish-black marginal borders.

Both sexes are figured by Seitz (*loc. cit.*).

pyritis Weymer (*loc. cit.*) appears to be a synonym.

The type specimen of *flavipennis* is in the British Museum.

W. SUMATRA : Sinabong, Padang, Proepoe, Korintjā Valley ; N.E. SUMATRA : Deli.

A NEW GENUS AND TWO NEW SPECIES OF GERRIDAE, SUBFAMILY HALOBATINAE (HEMIPTERA HETEROPTERA) FROM TRINIDAD

By W. E. CHINA, M.A., F.R.E.S.

DR. NOEL HYNES has recently submitted to me for identification a collection of water bugs from Trinidad. The GERRIDAE are represented by *Cylindrostethus palmaris* Drake & Harris, *Limnogonus hyalinus* F., *L. guerini* Leth. & Serv., *Trepobates comitalis* Drake & Harris, *Metrobates spissus* Drake & Harris, *Brachymetra albinervis* A. & S., *Rheumatobates imitator* Uhler, and two new species representing a new genus which I describe herewith. My thanks are due to Dr. Hynes for enabling me to study these insects. He has collected a considerable amount of ecological data on the aquatic Hemiptera of Trinidad and proposes at some future date to publish an account thereof, so that although I have some of his notes by me, I have refrained from publishing more than the bare facts of locality and habitat.

Hynesia gen. n.¹

Small Halobatinids allied to *Rheumatobates* but rather larger and more robust, with longer antennae, the hind legs of the male simple, not modified, but the front legs abnormal and strongly modified. Winged form unknown.

Head triangular, distinctly shorter (about two-thirds) than broad across the eyes, the latter strongly prominent laterally and extending posteriorly a little beyond the anterior margin of the pronotum, about one and a half times longer than greatest width, inner margins straight and parallel; vertex convex, rather more than twice as wide as an eye; the rather acute tylus projecting forward between the bases of the antennae; rostrum robust, extending slightly beyond the anterior coxae, on to the mesosternum, first and second segments short, third longest; antennae about as long as from apex of head to base of metanotum, with the second and third segments shortest, more or less subequal, second segment in male armed with a spine; basal segment in male more or less modified, armed with two spines. Pronotum truncate anteriorly: in middle less than one-fourth the length of mesonotum, but widening laterally into two backwardly produced, more or less apically angular lobes which are twice as long as pronotum in middle. Mesonotum convex, parallel-sided in male (the lateral margins broadly convex) with a percurrent median longitudinal suture or shallow furrow. Posterior margin of mesosternum deeply emarginate. Middle coxae strongly incrassate, more than twice as wide as hind coxae; front trochanters incrassate and more or less keeled beneath; front femora of male incrassate, the posterior margin armed with a row of strong spines, the anterior edge of ventral surface with a characteristic tuft of stout spines. Middle and hind legs normal, the middle femora and tibiae of male fringed with long hairs, all tarsi two-segmented. Genital segments of male as well as of female very elongate. Genitalia similar in plan to those of *Rheumatobates* Berg. but differing in the presence of a distinct bridge-like structure surrounding dorsal shaft of vesica (see figs. 4 d, and 5 d).

Genotype:—*Hynesia trinitatis* sp. n.

Allied to *Rheumatobates* Bergroth, which it resembles in the curiously modified male antennae. It differs, however, in the much broader, more transverse

¹ The genus *Telmatoberis* Berg. 1899 is unknown to me and the description not now available.

head, much shorter laterally between apex of eye and base of antenna, in the broader and more rounded eyes, in the much shorter pronotum and longer mesonotum, in the strongly incrassate and spined front femora of male, in the simple non-modified hind legs of male, and in the elongate male genital segments. The male antennae are much less modified than in *Rheumatobates*.

This genus is dedicated to the collector Dr. Noel Hynes.

***Hynesia trinitatis* sp. n. (figs. 1, 2 a, and 4).**

Colour:—♂. Dull brownish-black with ochreous yellow markings. Head ochreous yellow, with a large diamond-shaped dull black spot on disc, one angle extending to the

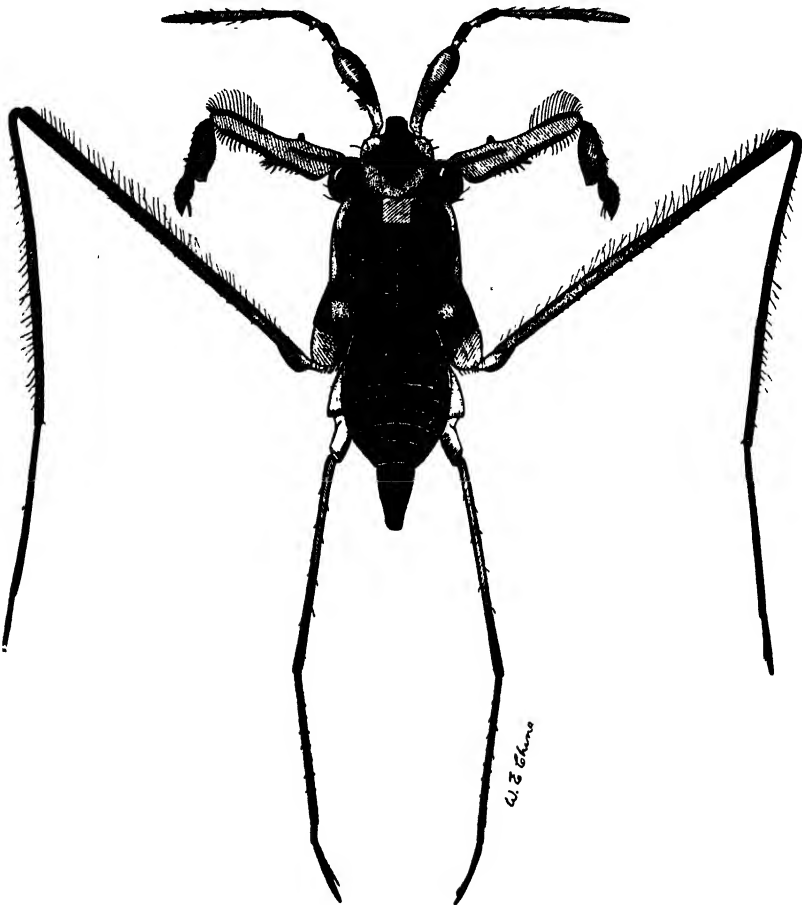


FIG. 1.—*Hynesia trinitatis* gen. et sp. n. ♂.

apex of tylus, the opposite angle to near middle of base of vertex, the other two angles extending nearly to lateral margins of head at level of apical margin of eyes, basal lateral angles of vertex dull black; underside pale yellow; eyes shining dark brown, rostrum dark brown, black at tip; antennae with basal segment pale yellow at base and beneath, shining brown above, second and third segments dark brown on apical half and sordid ochreous on

basal half, fourth segment entirely dark brown. Pronotum dull black with a quadrangular ochreous yellow spot in middle of narrow central region; propleura and prosternum yellow. Mesonotum dull black with an ochreous spot at each posterior lateral angle; mesopleura dull black, each with a large oval ochreous spot; mesosternum pale yellow with the anterior region broadly, and the posterior margin more narrowly brown. Metapleura dull black, mesosternum brown. Coxae and trochanters pale yellowish beneath, ochreous above, the middle coxa above with a large brown patch towards base, the middle trochanter largely brown on its outer face and the hind trochanter brownish inwards and towards apex; anterior femur yellow with two broad longitudinal stripes, the spines and bristles black; anterior tibia and tarsus brown to black, the former with its underside sordid ochreous and a longitudinal ochreous stripe on its upperside. Middle femur dark brown with two long ochreous stripes extending along the basal three-quarters above and below. hairs black;

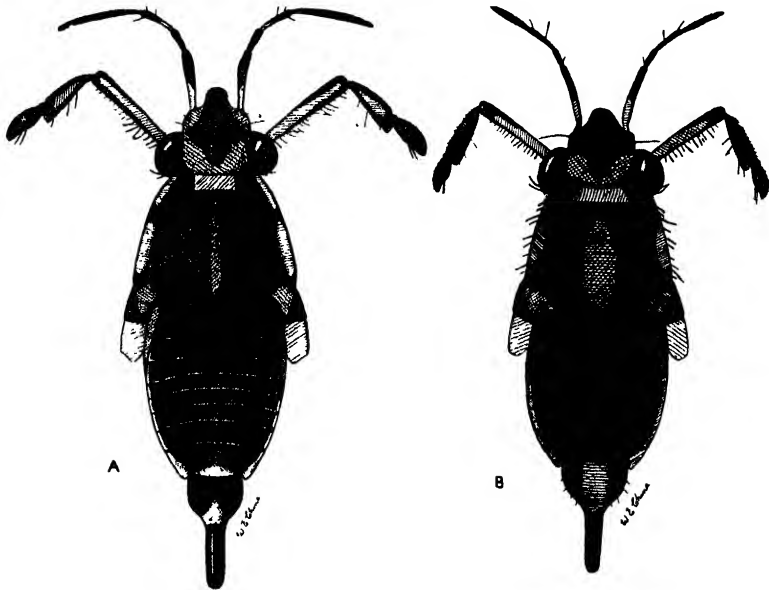


FIG. 2.—a. *Hynesia trinitatis* gen. et sp. n. ♀. b. *Hynesia trinitatis* gen. et sp. n. ♀. (Middle and hind legs omitted.)

middle tibia and tarsus dark brown or black, long hairs on former black; hind femur, tibia and tarsus with similar coloration to those of the middle leg. Abdomen dull black, the extreme edge of connexivum and the apical half of seventh tergite obscurely dark fulvous; venter brown, rather paler down middle, the apical half of the seventh sternite and the eighth pale ochreous.

♀. Similar to male but second antennal segment entirely black, mesonotum with a longitudinal yellow stripe down middle, narrow anteriorly and widening posteriorly to posterior margin. Middle coxae entirely yellow, the edge of the connexivum distinctly yellow, this yellow stripe broadening on to apical tergite. Apical half of bulbous eighth abdominal tergite yellowish, this pale area extending anteriorly in middle. Anterior femur yellow with a percurrent brown stripe along posterior margin and another brown stripe along apical third of anterior margin.

Structure :—♂. Head about two-thirds as long as wide across eyes (40 : 64); vertex between eyes more than twice as wide as one eye (34 : 15), eye only one and a half times

as long as greatest width seen from above (22 : 15), straight lateral margin of head between apex of eye and base of antennal tubercle less than half the length of eye (9 : 22); head above covered with short pubescence, longer towards anterior and basal lateral angles, with four rather indistinct pits, the basal pair in line with apices of eyes, the anterior pair much closer together and placed half-way between basal pair and base of clypeus (tylus), each pit with a long depressed bristle arising therefrom, a similar pair of sensory bristles posteriorly one in each posterior lateral angle of vertex; some long bristles arising from outer margin of vertex along margin of eye and a pair of similar bristles, one on each side between apex of eye and base of clypeus; posterior region of eye with 2 bristles. Relative length of rostral

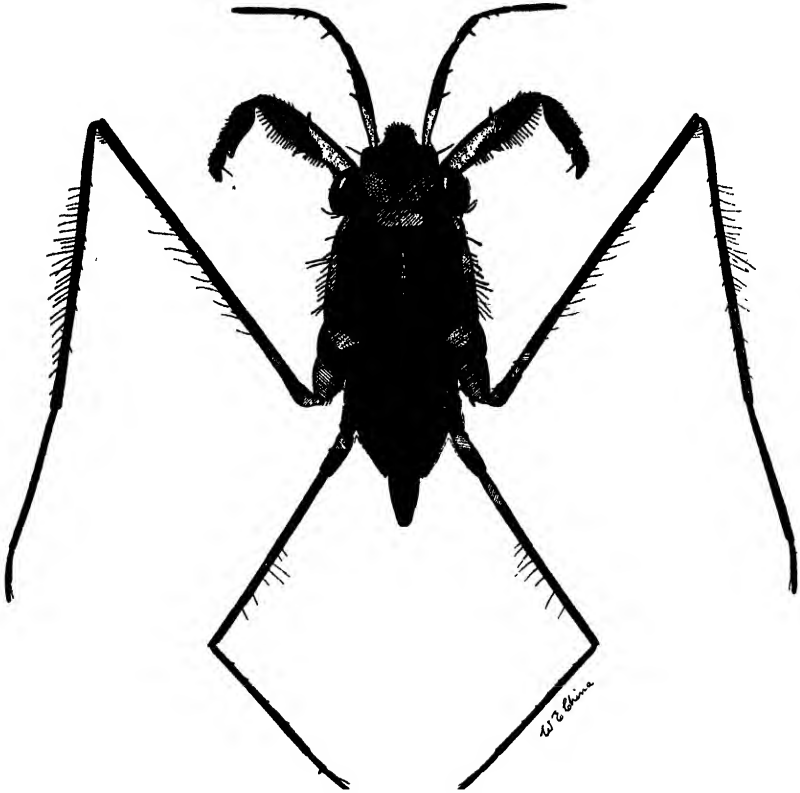


FIG. 3.—*Hynestia mangrovensis* gen. et sp. n. ♂.

segments (12 : 3 : 25 : 13); relative lengths of antennal segments 47 : 16 : 14 : 61; the basal segment incrassate except at extreme base and strongly curved, the convex face uppermost, the concave face downwards, the swollen region covered with moderately long suberect pubescence, the outer edge armed with two subequal robust black spines placed on the apical third of segment, the underside of segment with a dense, oblique row of long hairs extending from inner edge near base to the middle of the outer edge, where the hairs thicken to become more or less slender spines; inner edge with a line of long hairs becoming much denser and broader towards the apex and forming an elongate tuft of hairs; second segment one-third length of first, not incrassate, armed at middle of outer side with a stout black spine and between this and base of segment with a pair of slender obliquely backwardly

directed bristles; third segment shorter and slightly thicker than the second; fourth segment nearly four times as long as second, linear, moderately curved and inserted just below the apex of the third segment on its outer side, provided with a row of long hairs down outer side in addition to the normal short pubescence.

Pronotum covered with dense very short depressed pubescence, much sparser in middle, the lateral lobes nearly three times as long as pronotum at middle line and rather acutely angular at apices. Mesonotum nearly five times longer than pronotum in middle (50:11),

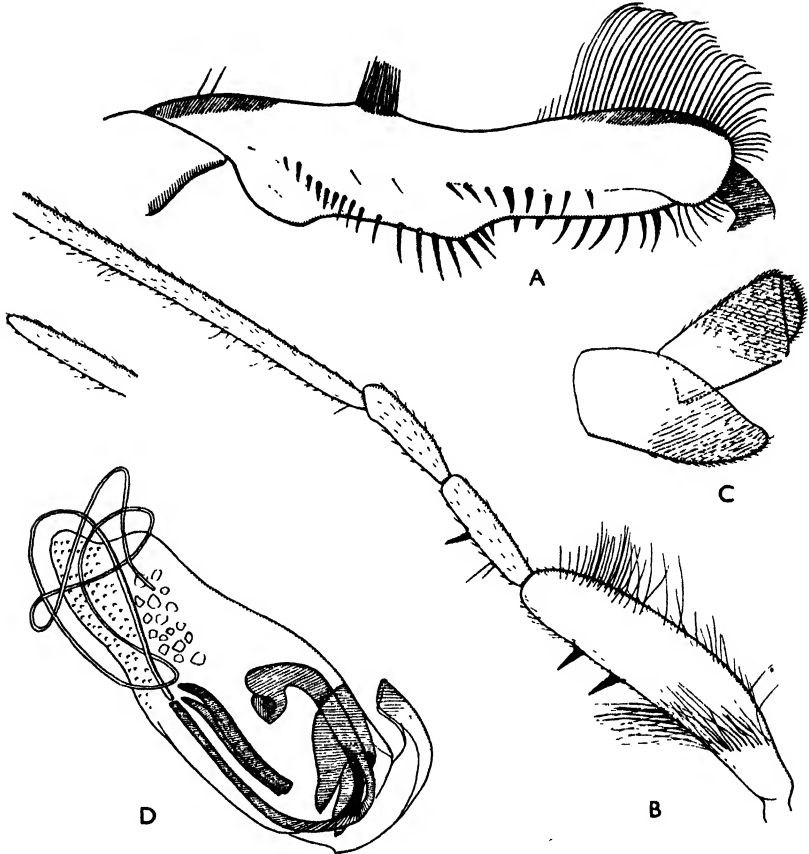


FIG. 4.—*Hynesia trinitatis* gen. et sp. n. a. Front femur (posterior-ventral view). b. Antenna (ventral view). c. Pygophor and anal tube (ninth and tenth abdominal segments). d. Aedeagus (right-hand view).

distinctly wider than long (66:50), parallel-sided, covered with very short depressed pubescence except down median suture. Front coxa small, cylindrical; front trochanter swollen, laterally compressed and more or less keeled ventrally, its outer surface shortly pubescent; front femur (fig. 4 a) somewhat incrassate, the basal half more or less compressed dorso-ventrally, the apical half compressed laterally so that the whole femur has a twisted appearance; basal fourth beneath with a deep oblique groove into which the keeled trochanter may fit when the femur is bent posteriorly, the anterior edge of this groove lined with a correspondingly oblique row of stout black spines, short, closely set and posteriorly hooked towards the base of the row and long, straight, and more widely separated towards apex

of row, which extends to the middle of posterior ventral edge of femur; thence another row of spines along the posterior ventral edge, short and robust at first, gradually increasing in length and becoming more slender and curved, extending to apex of femur. In the middle of the ventral surface of femur there is a short row of eight short spines parallel with and fairly close to the posterior ventral margin; on the anterior ventral side of the femur, about two-thirds its length from the apex, is a swelling surmounted by a bunch of closely packed and partly fused spines, while on the apical third of the anterior edge is a dense fringe of very long hairs curved towards the apex of the femur. Front tibia broad and rather swollen, dorso-ventrally compressed, armed with a single spiniform tooth on its anterior (outer) side towards the apex, with the apex produced in a lobe on the posterior side, this lobe fringed with a row of scale-like spines projecting in line with axis of tibia. Front tarsus very broad, two-segmented, the basal segment very small, claws long, inserted in middle of inner face of second segment. Middle legs with coxa strongly swollen, trochanter small, femur linear, armed with two rows of widely separated short black bristles on under-side and a dorsal fringe of long hairs; middle tibia and tarsus linear, the former with a dorsal fringe of long hairs and a few ventral short bristles, tarsus two-segmented, claws very short. Hind coxa small, little wider than trochanter, femur, tibia and tarsus linear, the femur and base of tibia armed with a few scattered short black bristles, the tarsus two-segmented, the claws long and slender, arising from near the base of second segment.

Relative lengths of legs :—

	Coxa	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front . .	5	7	24	11	1.5	6
Middle . .	9	6	62	55	30	10
Hind . .	8	7	34	26	2	12

23.5 = 1 mm.

Abdomen extending about half its length beyond the apices of hind coxae. Eighth and genital segments forming an elongate process which is nearly three times longer than wide at widest part of eighth segment (28 : 15). Genitalia figured (fig. 4 c and d). Lateral plates (Schroeder's 1931 terminology) linear, acuminate posteriorly, truncate anteriorly. Bridge-like sclerite surrounding dorsal shaft of vesica, relatively broad.

Total length, 3.1 mm. Width across middle of mesonotum 1.0 mm.

Structure :—♀. Longer and broader than male, head as in male but without four sensory pits; rostrum as in male; antennae simple, linear, the basal and second segments not incrassate and without spines or long hairs; the third segment with two or three long black bristles near apex; sometimes one on second segment (Madame Espagnole ♀); relative lengths of segments 30 : 13 : 19 : 42; the first and fourth segments distinctly curved. Mesonotum much wider posteriorly than anteriorly, the sides anteriorly convergent, not parallel as in male, with several long bristles and hairs. Front femur relatively slender, linear, posterior side with a fringe of long hairs and a row of very small setigerous teeth; front tibia and tarsus much less thickened than in male, the posterior side of tibia with several long black bristles. Relative lengths of legs :—

	Coxa	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front . .	6	8	22	11	1.5	7.5
Middle . .	9	6	59	50	29	10
Hind . .	7	6	38	23	3	11

23.5 = 1 mm.

Abdomen extending much more than half its length beyond the apices of hind coxae; eighth segment bulbous, narrowed suddenly towards apex; ninth segment elongate, parallel-sided.

Total length, 3.7 mm. Width across base of mesonotum 1.2 mm.

Habitat :—British West Indies, Trinidad; Caroni Swamp, under mangrove, 6 ♂♂ (including type), 17 ♀♀, and 1 nymph, 21.i.1942 (N. Hynes); Madame Espagnole, River Trinidad, under mangrove, 1 ♂, 1 ♀ and 1 nymph, 21.i.1942 (N. Hynes, coll. no. 149). Species "L" in Hynes' notes.

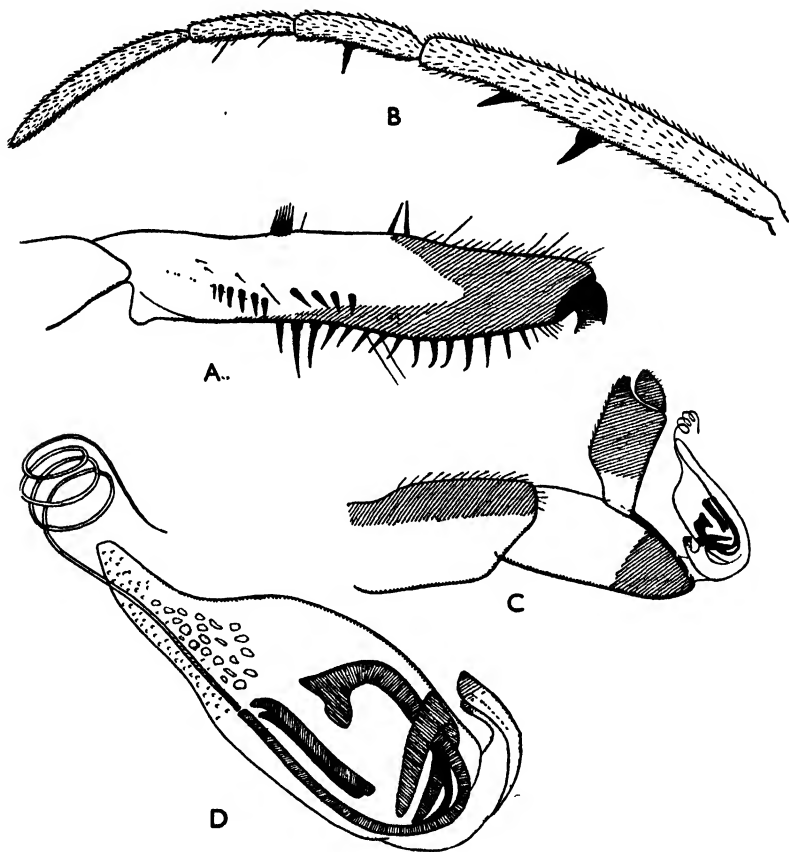


FIG. 5.—*Hynesia mangrovensis* gen. et sp. n. ♂. a. Front femur (posterior-ventral view). b. Antenna (ventral view). c. Pygophor and anal tube with aedeagus *in situ* (ninth and tenth abdominal segments). d. Aedeagus (right-hand view).

***Hynesia mangrovensis* sp. n. (figs. 2 b, 3 and 5).**

Colour :—♂. Dull brownish-black with ochreous yellow markings; head black above and pale brown beneath, the basal half of vertex fulvous except in middle, where the dark colouring of the front half of head extends downwards in middle in the form of a right angle which does not reach basal margin of vertex; eyes shining dark brown; rostrum dark brown, black at base and tip; antennae black except base of first segment, which is sordid pale yellow. Pronotum dull black with a wide pale yellow quadrangular spot in middle,

nearly twice as wide as that in *H. trinitatis*, and covering the whole of the central narrow region of pronotum; propleura (behind eyes) and prosternum yellow. Mesonotum dull black with the posterior lateral angles fulvous and a rather obscure fulvous stripe down the middle; mesopleura dull black, each with a large oval ochreous spot covering nearly the whole of the anterior half and extending dorsally to edge of mesonotum; mesosternum yellow, the anterior margin and a large semicircular area at middle of each side dark brown. Metapleura dull black, metasternum dull black with an obscure fulvous spot in the middle. Coxae and trochanters yellowish, the apical halves of middle and hind trochanters brown, the front femur yellowish shading to brown apically, the apical third dark brown, spines black; anterior tibiae and tarsi black; middle and hind femora, tibiae and tarsi dark brown to black with an obscure fulvous mark at base of upperside of each femur. Abdomen dull black, the eighth tergite largely fulvous. Venter dark brown, the seventh sternite rather lighter, the eighth sternite ochreous yellow and the genital segments dark brown.

♀. Similar to male but with basal segment of antenna yellow except for apical third; which is infuscate; the yellow quadrangular spot in middle of pronotum much wider and extending slightly posteriorly on to the lateral lobes of pronotum; longitudinal yellow stripe down middle of mesonotum very much broader; anterior femur yellow except for apical fourth, which is dark brown; basal half of anterior tibia sometimes obscurely fulvous, extreme base of middle femur obscurely fulvous, basal fourth of hind femur pale yellow. The edge of apical half of connexivum obscurely ochreous, the yellowish stripe broadening on to the apical tergite. The bulbous eighth abdominal tergite with a broad, pale yellow, percurrent stripe down middle. Mesosternum and venter largely fulvous yellow with base of former and sides of latter dark brown; eighth sternite ochreous yellow; genital segments black.

Structure :—♂. Head rather more than half as long as wide across eyes (35 : 62); vertex between eyes about two and a half times the width of one eye (35 : 13); eye rather more than one and a half times as long as greatest width seen from above (22 : 13); head above covered with short pubescence, longer anteriorly, the four setigerous pustules present as in *H. trinitatis* but not sunk in shallow pits or very obscurely so; a similar pair of sensory bristles placed posteriorly one in each basal lateral angle of vertex, three or four long bristles down each side of vertex along inner margin of eye and one on each side of head between apical margin of eye and insertion of antenna, posterior area of eye with two long bristles; relative length of rostral segments 9 : 3 : 23 : 12; relative length of antennal segments 50 : 16 : 14 : 24; the basal segment (fig. 5 b) only slightly thickened in basal two-thirds, sinuate, thickest in middle, armed on outer side with two stout spines arising from short protuberances, the larger placed just below middle of segment, the smaller placed half-way between the median spine and the apex of segment; second segment very slightly thickened, armed on outer side with a stout spine placed in middle; no long hairs or bristles on antennae as in *H. trinitatis* except on third segment, the fourth segment relatively much shorter than in *H. trinitatis* but similarly curved.

Pronotum with very short depressed pubescence, very sparse in middle, thicker and longer towards sides, the lateral lobes about two and a quarter times as long as pronotum in middle (24 : 10). Mesonotum rather more than five times as long as pronotum in middle (54 : 10), distinctly wider at base than long (68 : 54), slightly wider at base than anteriorly, covered with a very short depressed pubescence except down middle line and some long hairs and bristles down lateral margins. Front coxae short, semi-spherical; front trochanter somewhat swollen, lightly compressed laterally and rounded beneath; not keeled; front femur (fig. 5 a) distinctly incrassate, narrowing to apex, dorsal surface (upperside) in middle somewhat compressed above posterior edge, basal fourth of posterior side with a short shallow groove bounded at base on upperside by a distinct lobe or prominence; apical half of posterior (inner) side with a close-set row of strong black spines, longest in middle, beginning at apex of upper posterior edge and curving inwards (*i.e.*, downwards) to form at

the middle of the femur an arc of three or four longer spines directed upwards instead of backwards; lower edge of posterior side in middle with a much shorter, rather irregular row of black spines, of varying lengths extending basally to well beyond end of the upper row of spines; ventral surface with two close-set convergent stout spines near anterior edge, placed about two-thirds of length of femur from its base; also with a small short tuft of exceedingly close-set bristles, placed away from anterior edge, less than one-half of length of femur from base; apical third of anterior (outer) side with dense but rather short pubescence; front tibiae broad, scarcely swollen and laterally compressed, unarmed and without the tooth on the anterior side present in *H. trinitatis*; apex of tibia produced in a lobe on the posterior side, this lobe fringed with row of scale-like spines projecting in line with axis of tibia; front tarsus as in *H. trinitatis*. Middle leg with coxa swollen, trochanter small, femur linear, armed along posterior side with a row of short stout bristles and a sparse fringe of long hairs, anterior side without the fringe of long hairs present in *H. trinitatis*; middle tibia and tarsus linear, the former in middle with an anterior fringe of long hairs as in *H. trinitatis* and with a few, widely separated, very short bristles along posterior side; hind coxae small, little wider than trochanters, femur, tibia and tarsus linear, the femur in middle of posterior surface with seven or eight long hairs, the tibiae with widely-separated short bristles along posterior side, the tarsus with basal segment relatively much longer and the apical segment much shorter than in *H. trinitatis*.

Relative lengths of segments:—

	Coxa	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front . .	3.7	7.5	19	9	1	5
Middle . .	8	6	54	47.5	24	7.5
Hind . .	6	7	32	21	3	6

$$23.5 = 1 \text{ mm.}$$

Abdomen extending about half its length beyond apices of hind coxae. Eighth and genital segments forming an elongate tube which is twice as long as eighth tergite at base (30:15). Genitalia figured (fig. 5 c and d), very similar indeed to those of *H. trinitatis*. Differing only in greater length of filiform vesica and in shape of the bridge surrounding dorsal shaft of base of vesica, which is much narrower.

Total length:—2.8 mm., width across middle of mesonotum 0.9 mm.

Structure:—♀. Larger and broader than ♂, antennae simple, linear, basal and second segments unarmed with spines, but with the second segment with a long dorsal bristle and third segment with some long bristles on dorsal surface. Relative length of segments 31:13:17:25, the fourth segment relatively much shorter than in *H. trinitatis*. Pronotum with narrow median region much wider than in male. Mesonotum much wider posteriorly than anteriorly, the sides strongly anteriorly convergent with several long bristles and hairs. Front femur relatively slender and linear, posterior side with a fringe of long hairs, but without the row of minute setigerous teeth present in the female of *H. trinitatis*; front tibia and tarsus much less thickened than in male, the posterior side of tibia with several long black bristles. Relative lengths of legs:—

	Coxa	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front . .	3	6	20	10	1	8
Middle . .	8	7	52	45	23	9
Hind . .	6	5	34	20	4	6

Abdomen extending much more than half its length beyond the apices of the hind coxa; eighth segment bulbous, narrowed suddenly towards the apex, shorter than genital segment (26:30); the latter elongate and parallel-sided.

Total length:—3.3 mm. Width across base of mesonotum 1.1 mm.

Habitat:—British West Indies, Trinidad; Yarra River, 28 ♂♂, 27 ♀♀, and 2 nymphs, 17.v.1942 (N. Hynes, coll. no. 173); Yarra River, Blanchisseuse, 1 ♂, 7 ♀♀, 27.xii.1941 (N. Hynes, coll. no. 142). Species "K" in Hynes' notes.

Apart from the very differently shaped and armed antennae and front femora in the male, this species can be readily distinguished in both sexes from *H. trinitatis* by the black instead of yellow anterior lateral region of the head in front of the eyes; by the much wider, more transverse yellow spot in middle of pronotum; by the presence of a narrow longitudinal fulvous stripe down middle of mesonotum in male and by the much broader mesonotal stripe in the female. The yellow stripe down the middle of eighth abdominal tergite in female is much broader than in *H. trinitatis*.

In spite of the very distinct differences in colour and structure, the genitalia of these two species are extraordinarily similar, and do not show the distinctive specific differences found in *Rheumatobates*, which genus *Hynesia* strongly resembles.

NEW ORIENTAL ODONATE LARVAE

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

FOR many years now I have had in my collection a number of Odonate larvae which have remained undescribed. It is one of my regrets that during thirty years spent in the Orient, I did not, or rather could not, find time to study the larvae of Oriental Odonata as closely as I would have wished. What time could be spared by a hard-worked surgeon, especially in the later years, was almost entirely given to the collecting of imagines. The collecting of new species of the imago will always be more attractive than the discovery of new larvae, especially as it is often difficult to determine to which species the latter belong. During my sojourn in India, Ceylon and Burma, I was able to add knowledge of some 200 new species and subspecies of Odonata to science, and almost double that number to the Indian fauna. The late Dr. F. Ris, amazed at the wealth of my discoveries, wrote, "Sir, you have discovered a new world!" A great number of discoveries remain, however, to be made in this new world, and this applies particularly to the Odonate larvae, a task which will fall largely to Indian students of the future. Nevertheless I have been able to collect a number of notes and sketches of these larvae from time to time, which has now amounted to the proportions of a small volume; much material was added by that indefatigable collector Mr. T. Bainbrigge Fletcher, to whom all students of Oriental Entomology are greatly indebted. The sketches illustrating this paper were made by myself some years ago, and on reviewing them, I have not found it necessary to make many alterations. Those of *Merogomphus longistigma* (Fraser) and *Caliphæa confusa* Selys are of great interest, the latter exceptionally so as this insect has been for long one of the enigmas to worry the systematist: a knowledge of its larva now shows clearly that it is derived from the same root as *Mnais*.

I take this opportunity of correcting an unfortunate error to which Dr. Wheeler has called my attention. In my paper on his collection of Odonata made in the Federated Malay States (*Proc. R. ent. Soc. Lond.* (B) (7) 11) I gave Dr. Wheeler's name as "Raymond"; it should be "L. Richmond."

Order Odonata.

Family PLATYSTICTIDÆ.

Protosticta mortonii Fraser (fig. 1).

Head roughly triangular, rounded in front: eyes projecting but moderately laterally; ocelli distinct; antennae of moderate length, filiform, 7-segmented. Labium, when at rest, extending to posterior border of prothorax, elongately oval, median lobe flat, produced apically and deeply fissured, the sides of this fissure slightly overlapping, bordered with scale-like, quadrilateral setiform teeth. Lateral lobes Gomphine-shaped, bearing a long movable hook and ending in a robust inwardly curved tooth. Setae absent throughout but the mental plate striated and minutely pitted. Prothorax robust, rounded outwardly, presenting two large dorsal bosses. Thorax longer than wide, traversed by two rather deep corrugations or sulci. Wing-pads subcylindrical, narrow, extending to the apical border of segment 4 of the abdomen, held closely parallel. Legs long, slender, coarsely but sparsely

pilose, furnished with rows of variably sized setae or bristles as shown in fig. 1. Tarsi 3-segmented, claws simple. Abdomen cylindrical but flattened beneath, tapering gradually to the end. Each segment bordered apically by a row of fine spines. Caudal gills 3 in

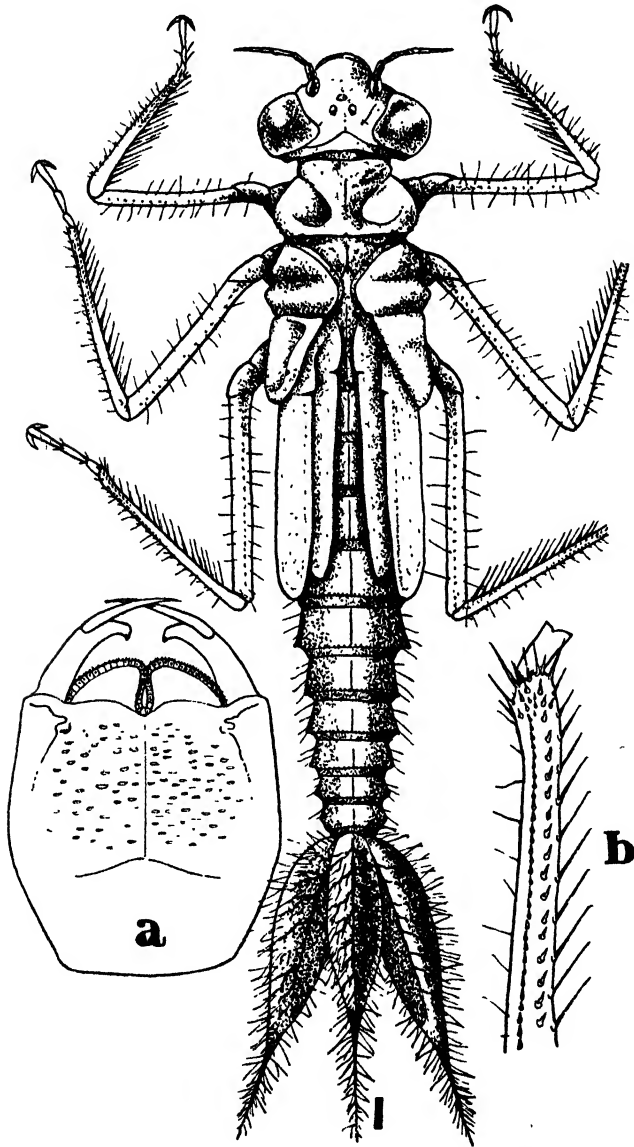


FIG. 1.—Larva of *Protosticta mortoni* Fraser. a. Labial mask. b. Distal portion of anterior tibia.

number, saccoid in character, the apposed surfaces flattened, the apices tapering to a filiform spine, the whole coarsely pilose and, in the natural state, coated with diatomaceous material. General colour of larva pale green without markings.

Habitat. Coorg, S. India. I found this species locally plentiful in a small mountain stream crossing the Sampaji Ghat road. The larvae were plentiful in the mossy scum-like coating of rocks in this stream, and exuviae could be

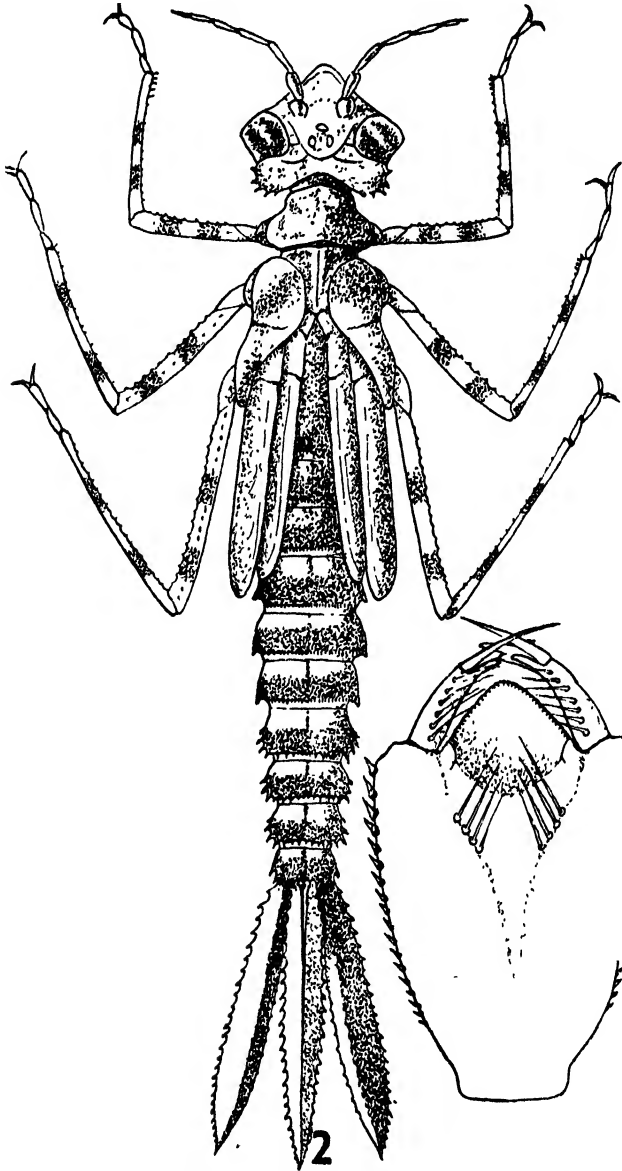


FIG. 2.—Larva of *Disparoneura apicalis* (Fraser). Labial mask inset.

found clinging to the sides of boulders lying in the bed of the stream. The larvae hug the surface of the rock closely and slither eel-like on this surface when disturbed.

Family PROTONEURIDAE.

Disparoneura apicalis (Fraser) (fig. 2).

Head rather pentagonal in shape, produced anteriorly, eyes angulate outwardly, behind which the postero-lateral borders of head are globular and bear 5 large spines; ocelli clearly visible; antennae 7-segmented, filiform, the 3rd segment the longest. Labial mask elongate, pyriformate and narrowing posteriorly: mid-lobe produced cone-like, this portion being deeply cupped and bordered by closely-set minute blunt teeth. Lateral lobes narrow, tapering, furnished with a long movable hook and, at the end, a short obtuse tooth. Setae present on both lobes, 2 sets of 4 on the middle lobe and a row of 7 on the lateral. Laterally the mask is bordered with closely-set short robust spines. Prothorax relatively small, constricted anteriorly, somewhat produced laterally and with two coarsely sculptured tubercles on the anterior dorsum. Thorax elongate, shallowly but broadly grooved transversely between the meta- and meso-thorax. Wing-pads flattened, narrowly elongate, closely parallel, extending to the middle of abdominal segment 4. Abdomen cylindrical but tapering apically; segments 4-6 with a robust lateral spine apically, the remaining segments coarsely spined laterally and all finely spined along the apical border. Caudal gills highly chitinated, triquetral in section, narrowly elongate and acutely pointed at apices; borders lined with moderately robust imbricated spines. Legs long and spidery: femora and tibiae with 2 rows of very short, widely-spaced spines; claws simple. The body colour is greenish with darker olivaceous markings on the apical halves of the abdominal segments, and dark annulations, two in number, on all femora and tibiae.

Habitat. Near Dubary, Cauvery R., Coorg. A large colony exists here, extending less than a quarter of a mile along the river's banks; the species never having been found elsewhere. Larvae are found clinging to debris and submerged roots alongside the steep banks of the river or in still pools in the broken river-bed.

Caconeura gomphoides (Rambur) (fig. 3).

Head transversely rectangular, anteriorly very broadly rounded: eyes small, rounded, projecting but slightly from the antero-lateral angles of the head; antennae filiform, 2nd segment short and robust, 3rd and 4th longer and more slim, all segments tipped with a pale annule. Whole of head dark olivaceous brown with paler markings bordering the eyes, encircling the well-defined ocelli and variegating the vertex and occiput. A row of spines bordering the postero-lateral aspect of the head. Prothorax small, rounded, coarsely sculptured on dorsum and variegated with pale markings on a dark olivaceous background. Thorax short and broad, coloured as for prothorax. Wing-pads flattened, closely-apposed, extending on to segment 3. Legs long and spidery, pale greenish with two strongly defined dark annules on each femur and tibia. Femora with a row of 6 or 7 longish robust spines: tibiae with a row of minute coral-like spines, more closely-set distally. Abdomen cylindrical, tapering gradually to the end, bordered laterally and apically with short teeth-like spines, dark olive green with a well-defined pattern of oblique stripes as inverted V's on mid-dorsum, and a single oblique stripe to the outer sides of these. Caudal gills 3 in number, lamellate with a well-defined node at junction of middle and distal thirds, which latter is abruptly expanded as a broad ovate fin: outer border of basal two-thirds finely spined: tracheae coming off from a central trunk obliquely. A broad band of dark pigment traverses the middle portion of gills.

Labial mask kite-shaped, tapering basally, somewhat hollowed out anteriorly, extending as far back as hinder end of prothorax. Mid lobe projecting but slightly anteriorly, this border and the apposed one of the lateral lobes lined with tiny crenate teeth. Lateral lobes

long and narrow, fissured slightly and narrowly at apex, the outer portion bordering this fissure shortly quadrate and hooked, the inner much longer and forming a robust black-tipped tooth: a very long movable hook springs from the apex of this lobe, which is

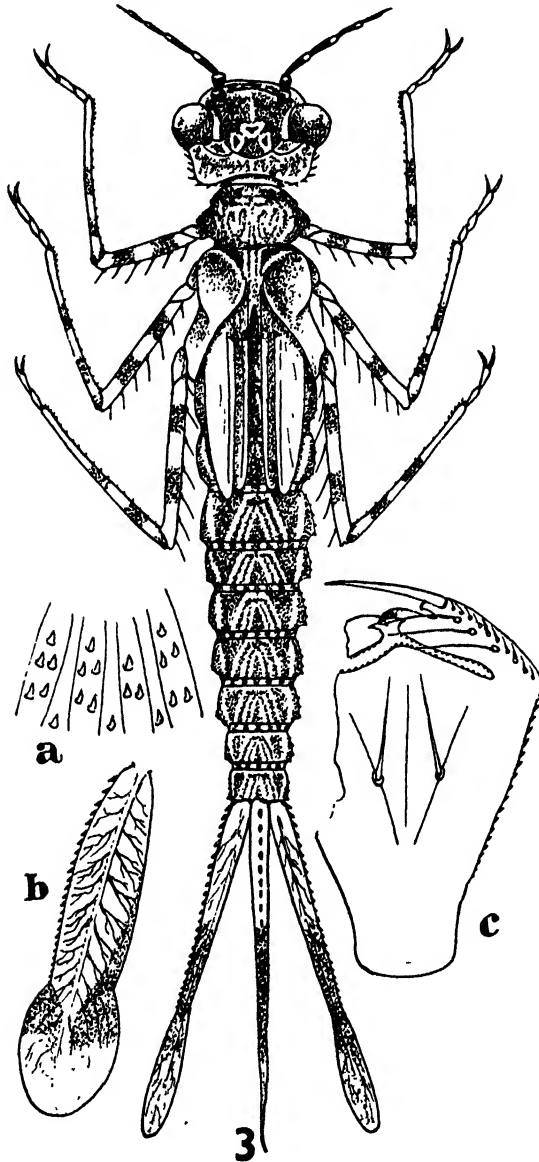


FIG. 3.—Larva of *Caconeura gomphoides* (Rambur). a. Teeth of gizzard. b. One of the caudal gills. c. Labial mask.

furnished along its outer border with 8 or 9 short setae and 3 very long ones to the inner side of these. The borders of the mentum are finely spined and there are two very long setae near the centre of the middle lobe. Gizzard with major and minor folds, the former with 3 to 5 teeth, the latter with single ones, all of the same size.

Habitat. This larva is found in the cold kundah streams of the Nilgiri Hills, S. India, generally in water-weed growing at the sides or bottoms of the deeper pools. It has adopted a temperate climate as opposed to all other

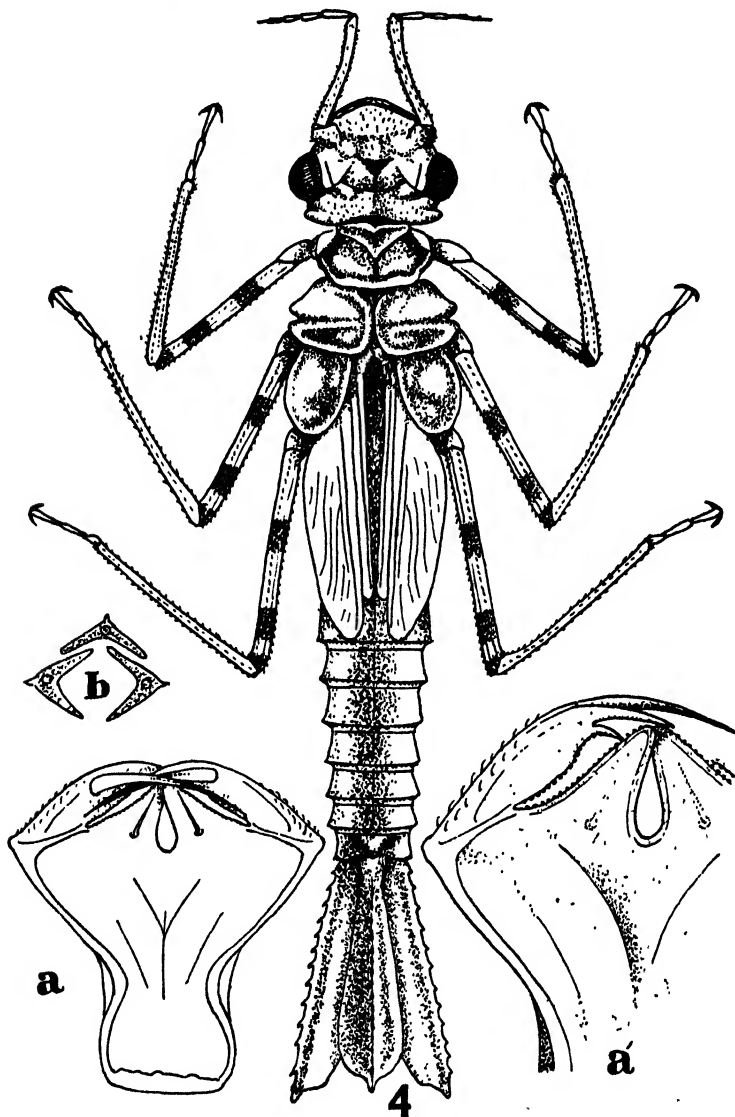


FIG. 4.—Larva of *Caliphaea confusa* Selys. a, a'. Labial mask. b. Transverse section of caudal gills.

species of the genus, and is not found below 7000 feet. Ice will be found, during the months of December and January, on pools bordering such streams as it inhabits.

Family AGRIIDAE.

Caliphaea confusa Selys (fig. 4).

Head rather large, broadly arched in front, shallowly emarginate posteriorly with the postero-lateral angles raised into ridges and produced laterally as obtuse spines: ocelli obscure and lying in a deeply pigmented sunken triangular pit: eyes comparatively small, hemispherical, situated at sides of head and projecting but slightly; antennae 7-segmented, scape short and broad, pedicel strongly curved, as long as the remaining 5 distal segments which are much finer and shorter. Mask of labium kite-shaped, extending to bases of anterior coxae, middle lobe strongly constricted near its middle, its apical border strongly produced and very deeply fissured, the two long triangular lobes thus formed slightly overlapping one another at their apices and each furnished with a long robust seta at the middle of its base. The anterior border of this middle lobe and the apposed ones of the lateral lobes bordered with tiny rounded closely-set teeth. Lateral lobes robust, chelate, ending in two teeth, the inner short and curved, the outer double its length and nearly straight. A very long movable hook present. Two rows of stiff short bristles bordering the lateral lobes, scarcely amounting to the rank of setae. Prothorax broader than deep, raised dorsally into two smooth bosses, separated anteriorly by an excavated triangular plate. Thorax with irregular deeply notched outer border and ridged and furrowed transversely on dorsum. Wing pads large, parallel, extending to apical border of abdominal segment 4. Legs long and slim: femora quadrate in section, each border finely spined, marked strikingly with 3 dark annular bands, one at the middle of limb, one subapical and the third apical; tibiae with 3 rows of closely-set, fine spines. Tarsi 3-segmented, claws simple. Abdomen short, cylindrical, each segment finely spined along apical border, and the 10th with a robust dorsal spine. Caudal gills 3 in number, the dorsal one overlapping the lateral, all triquetral in section with a strong mid-rib which is margined with robust imbricated spines, and with lateral foliate expansions. Narrow at base, thereafter gradually expanding to become broadly obtuse at apices with the mid-rib projecting shortly as an apical spine. The middle or dorsal gill is slightly shorter than the lateral which are about as long as the final six abdominal segments taken together.

Habitat. Shillong, Assam and Ghoom, Darjeeling, Bengal. This larva inhabits sluggish irrigation channels or brooks flowing through marshes. Mr. T. Bainbrige Fletcher's specimens, from which this description is taken, were found in a stream flowing through the Fruit Garden, Shillong, during April. The formation of the antennae and the shape of the labial mask are typical of the AGRIIDAE, and the shape of the latter comes closest to that of *Mnais*.

Family GOMPHIDAE.

Sieboldius nigricolor (Fraser) (fig. 5).

Length 22 mm.

I possess a single immature larva of a species of *Sieboldius*, which was found at Katkai, 4500 feet, N. Shan States, 18.xi.26. As it comes from the terra typica of *S. nigricolor* (Fraser), it is only fair to suppose that the larva belongs to this species, especially as this is the only known one from within Burmese limits. It resembles closely that described by Lieftinck for *S. japonicus* Selys (1932, *Bull. Raffles Mus.* 7: 102, pl. 2, figs. 1 and 2a). Possibly the larva, when full grown, may resemble this species even more closely, but in its present instar it presents some differences from *S. japonicus* and *Sieboldius* sp. Needham.

The antennae have the penultimate segment narrower, longer and with an inner basal short spine; the apical segment is very minute (this is altogether lacking in Liefstinck's figure); the eyes are larger proportionately and more prominent. The abdomen at first widens and then narrows slightly towards the apical segments, instead of progressively widening to the 8th segment; lastly the latter segment has the outer border sinuous and distinctly produced as an obtuse lateral spine. The colour is as usual: a deep blackish-brown. The abdomen is greatly depressed and shallowly cupped beneath in a limpet-like manner. The antennae are flattened and form a bevelled ramp with the sloping frons; lastly the legs are greatly expanded and flattened. In short, the whole insect is clearly *stream-lined*.

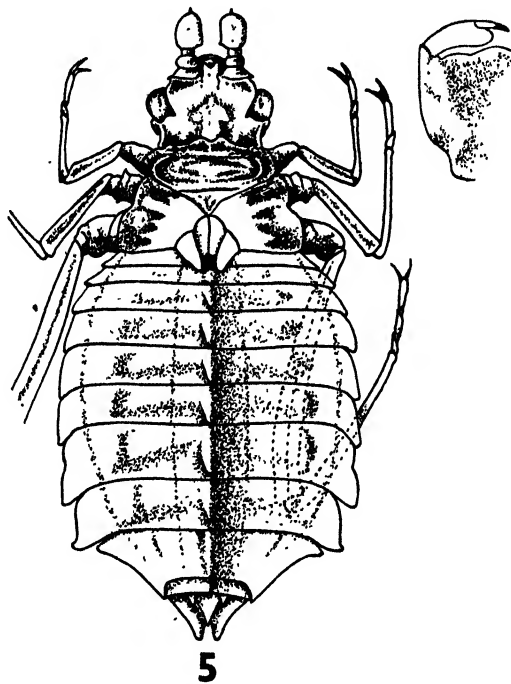
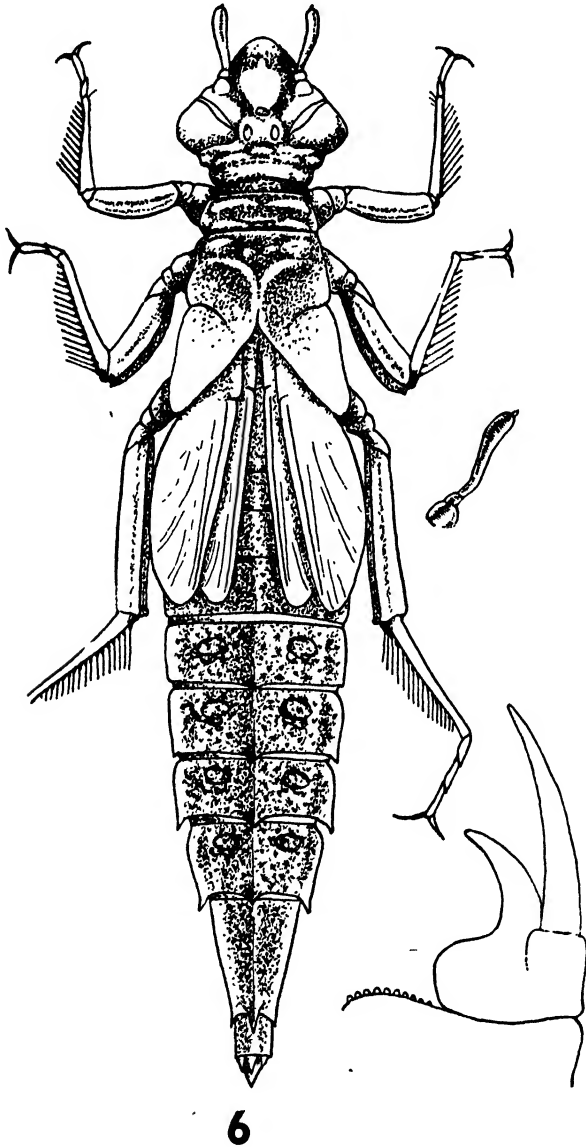


FIG. 5.—Young larva of *Sieboldius nigricolor* (Fraser). Labial mask inset.

Habitat. Found amongst leafy trash in a deep pool in the course of a torrential stream. This agrees with the habitat of larvae of *Lamelligomphus*, which are also built similarly. The flattened, foliate-shaped body, together with the dark brownish-black colour, is typical of the rotting foliage which is found in the bottom of all such pools as these insects inhabit. Undoubtedly the colouring and, to a less extent, the shape, is purely protective and aids their concealment. So effective is this, that I found the only way to find *Lamelligomphus* larvae was to spread out the leafy trash in the hot tropical sun until conditions became so uncomfortable for the insects that they were compelled to crawl away, when, of course, they were at once conspicuous. Stream-lining, however, is also essential, for during the monsoon these mountain streams become raging torrents and the bottoms of even the deepest pools are scoured out. Faced with conditions such as this, only the limpet-shaped abdomen and a body designed to offer no resistance to the current could save them from being

swept away. I do not believe that *Sieboldius* would breed in adventitious waters such as Laidlaw describes. Such spots dry up almost as quickly as they form in the tropics and although I have often seen dragonflies ovipositing in



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FIG. 6.—Larva of *Merogomphus longistigma* (Fraser). Antenna and Labial mask inset.

temporary rain pools, it was perfectly clear that nothing could ever result from the act. I may say that, on several occasions, I have seen Libellulines attempting to oviposit on the bonnet of my car, deceived by its glossy surface, and the reflection of the sun from it, into thinking it was water! On two occasions I

have noticed *Protosticta gravelyi* attempting to oviposit on the windscreen of my car, but no one would suggest from this that larvae might breed thereon. These frail dragonflies oviposit in the film of water flowing down the face of rocks and doubtless the sloping windscreen suggested a habitat of this nature.

Merogomphus longistigma (Fraser) (fig. 6).

Length of body 32 mm. Length of hind femur 7 mm.

Head triangular, produced squarely posteriorly; the eyes rounded and forming the outer angles of the head; antennae with short scape, conical in shape, a very much shorter pedicel, 3rd segment about six times longer than pedicel, apical segment a mere tiny spine. Labial mask of the conventional Gomphine shape, rectangular, flat: middle lobe with crenate border furnished with minute crenular teeth, lateral lobe very robust, with a long movable hook and a single sigmoidal tooth which has its inner border naked. Ocelli distinct; occiput with medial and lateral obtuse tubercles. Prothorax robust, two pairs of parallel ridges somewhat interrupted at the mid-dorsum; thorax with a third row of tubercles forming another parallel and broken ridge. Wing pads broad and long, almost parallel, extending nearly to apical border of segment 4. Abdomen cylindrical, broad at base and tapering thence to the end, which is prolonged in a pencil-shaped manner: segment 8 half as long again as 7, segment 9 greatly elongated and sharply tapered, twice as long as segment 7, segment 10 cylindrical, not more than one-third the length of segment 9, appendix dorsalis and cerci forming a minute conical end to abdomen. Legs short and very robust, femora strongly ridged and furnished with three longitudinal rows of minute spines, tibiae with long, closely-set bristles, shortening rapidly distally.

Habitat. Breeds in submontane streams and burrows deeply in the sandy bottoms, with all but the end of the abdomen buried. In this respect it resembles the larvae of *Macrogomphus*, and, I suspect, that of *Gomphus abdominalis* McLachlan, which is of the same shape. By their larvae, these three genera appear to be closely related but this is not borne out by generic characters, so that the larval similarity must be due to convergence; this coincidence is not surprising when one considers how useful the elongated end of the abdomen is in aiding the rectal gills to function whilst the body itself is almost entirely concealed. The original specimen from which this description was taken is in my collection and was taken whilst emerging on a rock in midstream at Kibribetta, N. Coorg, S. India, 4.v.24.

Anax immaculifrons Rambur (fig. 7).

Length of body 52 mm. Length of hind femur 11 mm.

General colouring olivaceous green with darker markings and mottling: the abdomen peppered with blackish spots, dorsal and lateral pairs of these being larger and particularly conspicuous. The intersegmental membranes coarsely striated; legs occasionally banded with dark olivaceous. Head flat, face and frons arched forward, transverse measurement considerably greater than antero-posterior. Eyes large, globular, bulging strongly from sides of head. Occiput broadly rectangular, its lateral angles tumid and rounded. Antennae filiform, scape short, cylindrical, pedicel of same length but less robust, remaining segments fine, the third the longer. Labial mask narrow and very elongate, tapering to mentum: middle lobe scarcely produced, cleft into two rounded or arched lobes, the free borders of which are fringed with short, closely-set setae: lateral lobe narrow, squared at the ends, the inner angle prolonged as a robust tooth, the inner border beset with short obtuse teeth: a long movable hook on the outer side markedly overlaps its fellow from the

opposite side. Prothorax and thorax irregularly cylindrical, rather short, the former strongly ridged posteriorly, the latter with wavy undulated dorsal plates. Legs rather long, robust, femora with flat surfaces separated by four finely spined ridges: tibiae with a few spines on the inner side: claws strong, simple. Wing pads closely applied to the sides, broad, nearly parallel. Abdomen narrow at base, gradually broadening to as far as the 8th segment, then slightly narrowing again to segment 10: the appendix dorsalis and cerci

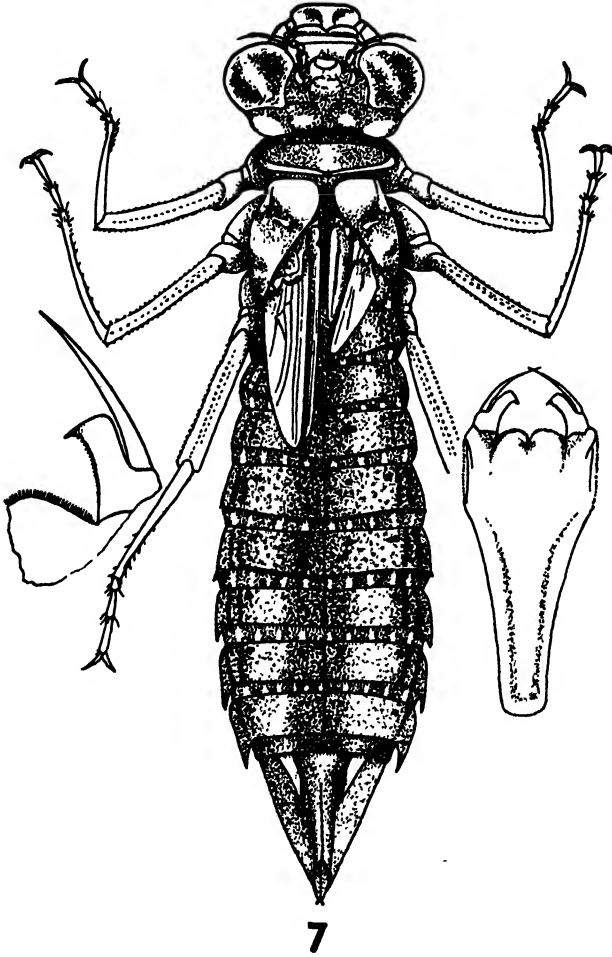
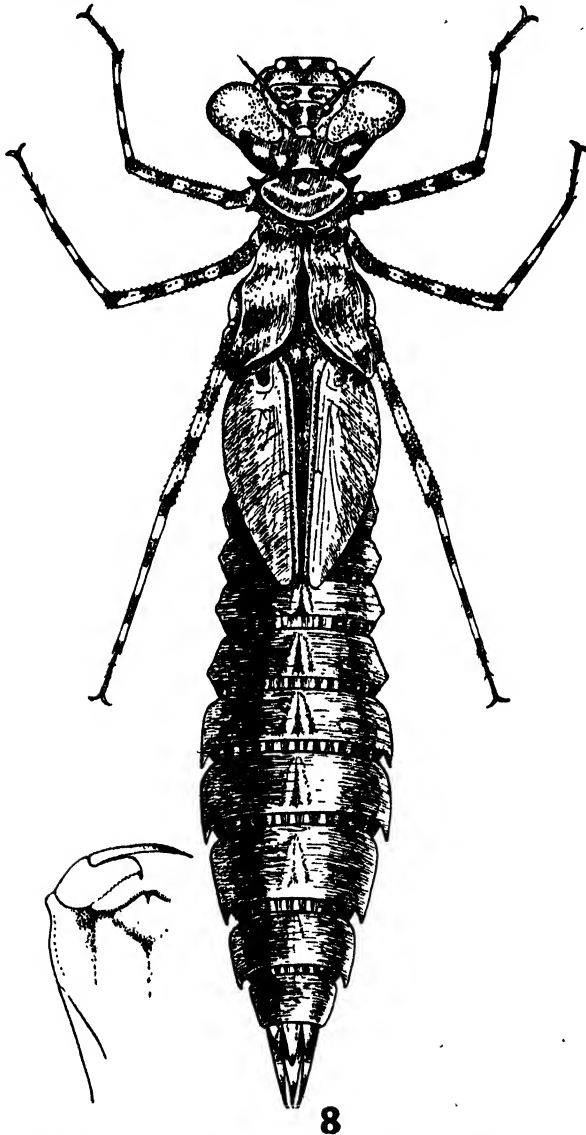


FIG. 7.—Larva of *Anax immaculifrons* Rambur. The right side shows the undeveloped wing pads of an early instar: the left side the full adult stage. Inset labial mask and lateral lobe of same.

closely bunched together to form a stout conical protuberance at end of abdomen. Segments 7 to 10 with lateral spines, small and inconspicuous on 7, gradually enlarging to segment 10, particularly large on the last two segments: no dorsal spines. Each segment bordered posteriorly with a row of short setae.

Habitat. In ponds or sluggish streams with muddy bottoms. Although essentially palaearctic in its habitats, it breeds occasionally, in the tropics,

practically at sea-level as in Hongkong, where the reservoirs are its breeding places. In S. India I have seen the imago during the cooler months of the year, hawking in the streets of Coimbatore at an altitude of 1400 feet, but I



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FIG. 8.—Larva of *Cephalaeshna orbifrons* Selys. Labial mask inset.

have never found it breeding there; 3500 feet appears to be the lowest altitude at which larvae can be found and it becomes increasingly common until an altitude of 7250 feet is attained. In the sluggish channels cut through the peaty bogs of the kundahs (grassy moors) of the Nilgiris, S. India, I have found

the larvae in great numbers, the muddy bottoms being criss-crossed with their tracks. Emergence takes place during the night, and flight just at dawn. As larvae can be taken of all sizes and instars at any one time, I am led to infer that its life-history extends over two or three years. It is a strong pugnacious larva, and a not too pleasant insect to handle owing to its sharp spines.

Cephalaeshna orbifrons Selys (fig. 8).

Length of abdomen 23 mm. Length of body 35 mm. Hind femur 7 mm.

A remarkably narrow and elongated larva with strongly contrasted markings and striped legs. Head large, pentagonal in shape with the large pyriform eyes forming the antero-lateral angles. Antennae filiform, scape very short, thick, pedicel half as long again but more slim, remaining segments thin, the 3rd the longest and about twice the length of pedicel; ocelli distinct. Pale spots are present on the middle of the clypeus, a row of three on the labium and a row of five on the occiput. Labial mask narrow and elongate, tapering towards the mentum, without setae: middle lobe produced cone-like, the tip of the cone rather deeply cleft, the free border fringed with closely-set, short setae. Lateral lobes robust, moderately short, apical end squared and with inner apical angle produced as a robust tooth, and inner border furnished with small obtuse teeth. A long movable hook on its outer side. Sides of mask on dorsal surface with a row of very fine spines. Prothorax with a broadly arched prominent ridge posteriorly and with two robust divaricate spines on each side: thorax narrow, elongate, the pleural plates much undulated. Wing pads nearly parallel, closely apposed to the sides of the body, extending as far as segment 4. Legs very long and slim, both femora and tibiae marked with strongly defined dark annules: femora with three rows of short coral-like spines: tarsi and claws dark. Abdomen very narrow at base, broadening club-like to as far as segment 7, after which it tapers evenly and rapidly to the end which is formed by the closely-apposed appendix dorsalis and cerci in the form of a stout conical spine; segments 6 to 9 with robust backwardly directed lateral spines; segments 4 to 9 with mid-dorsal arrow-head-shaped markings; all intersegmental membranes coarsely striated. Anal appendages all tipped with black.

Habitat. In weedy sluggish streams. The specimen from which this description was taken is from Manipur, Assam, and was taken by Dr. S. Kemp. The imago has been taken in Assam, Burma, Bengal and Sikkim. The larva bears a strong resemblance to those of *Gynacantha*, but differs by the absence of setae on the mask: it is the first of this archaic group to be described.

A REVISION OF THE GENUS *SUASTUS* MOORE
(LEPIDOPTERA : HESPERIIDAE)

By W. H. EVANS.

(*British Museum (Natural History).*)

THE abbreviations are the same as those used in Evans, 1932, *Identification of Indian Butterflies*, 2nd edition.

SUASTUS Moore, 1881 : Type *gremius* Fabricius : type fixed by author.

1 (2a). UnH with a conspicuous black cell-spot, at least as large as any discal spot.

gremius. 3 subspecies.

(a). UpF with white spots. Above and, more particularly, below, darker than continental specimens. F 18 mm.

Subsp. *subgrisea* Moore, 1878 : ♂ Ceylon : type B.M.

B.M. 16 ♂♂, 23 ♀♀ Ceylon.

(b). Similar but paler. F 18 mm.

Subsp. *gremius* Fabricius, 1798 : "India Orientali" (South India assumed).

Syn. *disu* Kollar, 1844 : Himalayas.

robsonii De Nicéville, 1895 : ♂ Mussoorie. Aberration.

centripuncta Seitz, 1927 : no locality. Aberration.

B.M. 14 ♂♂, 14 ♀♀ South India. 4 ♂♂, 4 ♀♀ Central India. 2 ♂♂, 2 ♀♀ N.W. Himalayas (to Murree). 3 ♂♂, 5 ♀♀ Bengal. 11 ♂♂, 2 ♀♀ Sikkim. 10 ♂♂, 6 ♀♀ Assam. 7 ♂♂, 8 ♀♀ Burma. ♂, ♀ Siam. 3 ♂♂, 3 ♀♀ Hong Kong. ♂ Hainan. 8 ♂♂, 5 ♀♀ Formosa.

(c). ♂ above unmarked : ♀ upF spots in spaces 2 and cell. UnH whitened as in *minuta*. F 17 mm.

Subsp. *chilon* Doherty, 1891 : ♂ Sumba.

B.M. 2 ♂♂ Sumba. ♂, ♀ Flores.

2a (1). UnH black cell-spot inconspicuous or absent.

2 (3a). UnF broadly white from middle to termen. F 18 mm. UpF spotted.

migreus Semper, 1892 : ♂ Luzon.

B.M. ♂ Luzon. 2 ♂♂ Mindanao. ♀ Philippines.

3a (2). UnF dorsum never white to termen. Smaller, F 14 mm.

3 (4). UnF dorsum centrally white marked. UpH no tornal white area.

minuta. 5 subspecies (*sala* auctt. nec Hewitson, and *rama* auctt. nec Mabille).

(a). UpH unmarked. UnH tornal two-thirds white.

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F

Subsp. *minuta* Moore, 1877 : ♂ Ceylon : type B.M.

syn. *sinhalus* Plötz. 1885 : ♂ Ceylon.

B.M. 24 ♂♂, 11 ♀♀ Ceylon.

(b). UpF typically with only two spots (in spaces 2 and 3). UnH dark brown, markings very faint. H cilia dark brown.

Subsp. *bipunctus* Swinhoe, 1894 : ♂ Nilgiris.

B.M. 11 ♂♂, ♀ South India (Coorg. Nilgiris).

(c). UpF typically with spots fully developed; two small separated cell-spots, discal spots in spaces 1b, 2 and 3 and an apical dot in space 6. H cilia narrowly white.

Subsp. *aditia* nov. : ♂ Sikkim : type B.M.

B.M. 3 ♂♂, ♀ Sikkim. 5 ♂♂, 2 ♀♀ Assam. 23 ♂♂, 11 ♀♀ Burma (to Mergui). 10 ♂♂, 6 ♀♀ Siam. ♂ Java (?).

(d). Larger (F 15 mm.) and darker. UpF spots larger, but no apical spots in space 6.

Subsp. *aditus* Moore, 1884 : ♂ Andamans.

B.M. 11 ♂♂, 13 ♀♀ Andamans. ♂ Coco Is.

(e). UpF with spots in spaces 2 and 3 and a lower cell-spot. UpH cilia white. UnH with the tornal two-thirds white as in *minuta*.

Subsp. *scopas* Staudinger, 1889 : ♂ Palawan.

B.M. ♂ Palawan.

4 (3). UnF dorsum entirely dark brown. UpF unmarked. UpH with a sub-tornal white area and cilia white. UnH white except for narrowly dark costa.

everyx. 2 subspecies. Genitalia as *minuta* : fly together in Tavoy.

(a). UpH tornal white area narrow, 2 mm., and divided along vein 1b.

Subsp. *everyx* Mabilie, 1883 : Malacca.

syn. *tripura* De Nicéville, 1891 : ♀ Perak : type B.M.

B.M. 2 ♂♂ Burma (Tavoy). ♀ Siam (Renong). 4 ♂♂, ♀ Malaya. 4 ♂♂ Sumatra. 6 ♂♂, 2 ♀♀ Borneo.

(b). UpH tornal white area 3 mm., entire.

Subsp. *albescens* Mabilie, 1891 : ♂ Java : type B.M.

B.M. 9 ♂♂, 4 ♀♀ Java.

A REVISION OF THE GENUS *AEROMACHUS* DE N.
(LEPIDOPTERA: HESPERIIDAE)

By W. H. EVANS.

(British Museum (Natural History).)

THE genus *Aeromachus* merits careful study in respect of the value of structural characters. The following key is based on the antennal club, the variation of which is remarkable and the differences that, in some Hesperiid, would be regarded as of generic value. The genitalia indicate a close relationship between *inachus* and *propinquus* and it is remarkable that the two species appear not to fly anywhere together, while the variation in *stigmata* seems to show that the two very different types of secondary sexual characters are actually closely connected: in fact, *stigmata*, which has genitalia very similar to *inachus*, seems to combine in its various forms the characters of *inachus* and *propinquus*. Then, again, the alliance between *jhora* and *dubius* would appear to be much closer than is indicated in the key and, here also, they do not seem to occur anywhere together.

The abbreviations are the same as those used in Evans, 1932, *Identification of Indian Butterflies*, 2nd edition.

AEROMACHUS De Nicéville, 1890: Type *stigmata* Moore,
fixed by De Nicéville.

Syn. *Machaeus* Swinhoe, 1912: type *jhora* De N., fixed by Swinhoe.

1a(9a). Antennae tip pointed.

1b(7a). Antennae with well-defined apiculus from beyond thickest part of club, at right angles to club: nudum 5/5.¹ Wings produced, costa notably longer than dorsum in ♂.

1c(3a). UnH with purple markings. UpF unmarked.

1 (2). ♂ upF with a white stigma from mid vein 1 to base vein 3, set in a black area and almost entirely covered with black hairs: vein 2 displaced to near vein 3, which is mid veins 2 and 4: H veins 6 and 7 hairpinned. Uncus broad with the end rounded. UnH central purple band comparatively broad and continuous. F 13 mm. Antennae chequered, and white under club.

catocyanea Mabille, 1876: Thibet: Paris Mus. No figure.

B.M. 10 ♂♂ W. China (Tatsienlou. Siaolou. Tsekou. Likiang-Yunnan).

2 (1). ♂ upF with an obscure short whitish dash over mid vein 1: veins normal F and H. Uncus similar. UnH central markings narrow and broken. F 13 mm. Antennae similar.

kall De Nicéville, 1895: ♂ Sikkim: type Calcutta Mus.: figured. Fig. *Lep. Ind.*; Seitz (very bad).

¹ Of the portion of the antennae denuded of scales (nudum) there are 5 segments on the club before the reflexed apiculus, and 5 on the apiculus.

B.M. 4 ♂♂ Sikkim. 34 ♂♂, 2 ♀♀ Assam. 31 ♂♂ North Burma (to Shan States).

3a(1c). UnH with white or grey markings.

3b(5a). UnH with the veins outwardly more or less white. Uncus tapering to a rounded end, narrow.

3 (4). UnH with a conspicuous white spot towards base of space 7. Antennae club conspicuously white behind club (unique in genus). UpF with well-marked white spots. UnH with black cell-spots.

inachus. 3 subspecies.

(a). UnH veins ochreous, contrasting with the white spots. Larger: ♂ F 13 mm. (Japan: Amur specimens are smaller).

Subsp. *inachus* Ménétériés, 1859: Amur. Figured by author in Schrenk's *Reisen*, 1859: Pryer, 1889: El. & Edw. and genitalia. Leech's figure is of *propinquus*.

B.M. 12 ♂♂, 12 ♀♀ Japan. 3 ♂♂, ♀ Amur. ♂, ♀ "West China" (probably Japan).

(b). UnH veins nearly as white as the spots. Smaller. ♂ F 11½ mm.

Subsp. **nanka** nov.: ♂ Lungtau, Nanking, Prov. Kiang Su, China. 9.vi.1933 (*H. Hône*) in B.M.

B.M. 10 ♂♂, ♀ type locality. ♂, ♀ Taishan, Shantung. 2 ♂♂ Hoang-Shan, Hunan. ♂, ♀ Leon Fang. 2 ♂♂ Hou Pe.

(c). UpF white spots smaller: unH much darker, whitish bands more conspicuous.

Subsp. *formosanus* Matsumura 1931: ♂ Formosa.

B.M. Nil. Not seen and identification doubtful.

4 (3). UnH without a conspicuous spot towards base of space 7. Antennal club only white below. A confusing species as to determination of forms and subspecies.

stigmata. 5 forms.

(a). ♂ upF with a conspicuous black stigma accompanied by the vein distortions as in *catocyanea*. UpF with conspicuous white spots. UnH no black spot in cell. Apparently the dry-season form in the West Himalayas. F 12 mm.

Form *stigmata* Moore, 1878: ♂ Mussoorie: type B.M. Figured in *Lep. Ind.* El. & Edw. fig. is of the wet-season form.

B.M. 6 ♂♂, 6 ♀♀ N.W. Himalayas (Murree to Kumaon). 16 ♂♂, 3 ♀♀ Sikkim.

(b). Similar but stigma set in a large black area. UpF spots obscure or more usually absent; unF cell-spot absent. UnH black cell-spot usually present in Eastern part of its range and absent in the West. F 12 mm.

Form **soda** nov.: ♂ Sikkim, 24.ix.1889 (*Otto Müller*), in B.M. Figured by El. & Edw. as *stigmata*.

B.M. 4 ♂♂, ♀ N.W. Himalayas (Murree to Kumaon). 20 ♂♂, 2 ♀♀ Sikkim. 28 ♂♂, 5 ♀♀ Assam. 15 ♂♂, 3 ♀♀ Burma (to Karens). ♂ Yunan (Manao).

(c). Exactly like *stigmata* except that the stigma is narrow and inconspicuous, but the spots upF are very close and sharply defined. F 12 mm.

Form *obsoleta* Moore, 1878 : Cherrapunji : type " Coll. Staudinger " (not seen).

Syn. *discreta* Plötz, 1885 : India (Plötz drawing No. 1477) in B.M.(N.H.), reproduced by Swinhoe, 1908 ; seems to correspond more with *obsoleta* than anything else. El. & Edw. figure represents a ♂ and Seitz' figure is a reduced copy of it.

B.M. 6 ♂♂, 2 ♀♀ Manipur (Kabruk, Sebong). Naga Hills (Kohima and Kirbari). ♂ Bharno.

(d). UpF as *stigmata*, but the stigma is reduced to a black dot under the origin of vein 3 and an obscure whitish dash over the middle of vein 1 : the veins are normal. UnH with a large and very conspicuous black spot in the cell. F 12 mm.

Form *spuria* nov. : ♂ Kanglatombi, Manipur, 3000 ft., vi.1911 (*H. C. Tytler*) : in B.M.

B.M. 7 ♂♂ type locality.

(e). Larger, F 13 mm. UpF discal spots faint or absent. ♂ with discal stigma reduced exactly as in *spuria*, of which it is probably the dry-season form. UnH with conspicuous black cell-spot.

Form *shanda* nov. : ♂ Kalaw, S. Shan States, 4200 ft., 9.viii.1926 (*H. C. Tytler*) : in B.M.

B.M. ♂ N. Shan States, Maymyo (18.ix.1931). 2 ♂♂ S. Shan States (type and 22.ix.1924).

The last two forms might be combined as a subspecies.

5a(3b). UnH veins not paler than the ground. F produced.

5 (6). ♂ upF with a conspicuous discal stigma as in *stigmata* : spots absent. UnH spots very small. May be a *stigmata* form and has very similar genitalia. F 12 mm.

piceus Leech, 1894 : ♂ Moupin : figured by Leech : in B.M.

B.M. 2 ♂♂ type locality. ♂ Szechuan, Kwansien.

6 (5). ♂ upF with a tiny whitened dash over mid vein 1. Uncus with very broad flat end, centrally indented. UpF spots faint.

jhora. 3 subspecies.

(a). UnH with bright greenish-yellow scaling, discal spots small, but conspicuous and compact. Cilia whiter than usual. F 12 mm.

Subsp. *jhora* De Nicéville, 1885 : ♂ Sikkim : type Calcutta Museum : figured : *Lep. Ind.* figures are very poor : Seitz figure is fairly good.

B.M. 25 ♂♂, 8 ♀♀ Sikkim.

(b). UnH with olive scaling, discal spots small and irregular. F 12-13 mm. Very variable.

Subsp. **creta** nov.: ♂ Khasia Hills, ix.1886 (*H. J. Elwes*): in B.M.: figured by El. & Edw., 1897, as *discreta*: ♀ figured by Seitz as *discreta*.

B.M. 25 ♂♂, 12 ♀♀ Assam. 36 ♂♂, 18 ♀♀ North Burma to Karens. ♂, ♀ Kuatun, 2300 m., Fukien, China. ♂ from Malaya, Fraser's Hill, 4000 ft., n Coll. Corbet.

(c). Small, F $11\frac{1}{2}$ mm. UnH with olive scaling, discal spots broad and compact.

Subsp. **skola** nov.: ♂ Sumatra, Battak Mts., v.1894 (*L. Martin*): in B.M.

B.M. 17 ♂♂, 10 ♀♀ Sumatra (type locality: Scolak Daras: Korinchi, 4000 ft.).

7a(1b). Antennal club obtuse about thickest part, apiculus not at right angles: nudum 8 segments.

7 (8). ♂ upF with a black stigma as in *stigmata*, but the hind-wing veins 6 and 7 are normal. UpF the small white spots present or absent. Uncus as in *inachus*. F 13-14 mm.

propinquus. 2 subspecies.

(a). UnH markings as in *inachus* but the area between the two rows of white spots is filled with conspicuous black spots separated by white veins.

Subsp. *propinquus* Alpheraky, 1897 (June): ♂ Va-ssou-kuou. Figured by Leech as *inachus*.

syn. *chinensis* Elwes & Edwards, 1897 (October): ♂ Washan: in B.M.

syn. *thibetanus* Austaut, 1900: S.W. China.

B.M. 46 ♂♂, 7 ♀♀ W. China (Ta-tsien-lou and neighbourhood).

(b). UnH markings much reduced, consisting only of a black cell-spot, black spot mid space 7 white-edged and discal row of black-edged white spots. UpF and unF spotless.

Subsp. *tali* Evans, 1932: ♂ Tali, Haut Yunan: type B.M.

B.M. 27 ♂♂ W. China (Lotsekiang. Tsakou. Yunan).

8 (7). ♂ upF with small pale dash over mid vein 1. UpF spots very faint. Below marked as in *jhora*. Small, F 11 mm. Uncus as *jhora*, but much narrower.

dubius. 3 subspecies.

(a). ♂ F termen straight. UnH with dark ochreous scaling.

Subsp. *dubius* Elwes & Edwards, 1897: ♂ Peermaad: figured: type B.M. Figured *Lep. Ind.* and Seitz.

B.M. 35 ♂♂, 8 ♀♀ South India (Travancore to Coorg and Palnis).

(b). ♂ F termen convex. UnH with olive scaling and distinct markings.

Subsp. **impha** nov.: ♂ Imphal, Manipur, 2000 ft., 18.vi.1911 (*H. C. Tytler*).

B.M. 14 ♂♂, 10 ♀♀ type locality. 6 ♂♂, ♀ North Burma to Ataran, Yunan (Manao). 3 ♂♂, 2 ♀♀ Tonkin. 6 ♂♂, 8 ♀♀ Hainan.

(c). As *impha*, but unH markings very faint.

Subsp. *javanicus* Elwes & Edwards, 1897 : ♂ Java : figured : type B.M. Figured by Piepers & Snellen, as *discreta*, and by Seitz.

B.M. 4 ♂♂, 3 ♀♀ Java.

9a(1a). Antennae tip blunt, club straight, no real apiculus : nudum 8 segments. UpF spots very faint or absent. UnH similar to *jhora*, but markings often very faint : scaling olive. Very small, F 10 mm.

9 (10). ♂ with stigma as in *stigmata*, but much more raised and the unF is correspondingly channelled : on F vein 2 is displaced, but veins 6 and 7 on H are normal. Antennae = $\frac{1}{2}$ costa as usual. Uncus slender, mushroom-like at end.

musca Mabille, 1876 : ♀ Luzon : type B.M. Figured in Seitz.

B.M. 8 ♂♂, 2 ♀♀ Philippines.

10 (9). ♂ without any trace of a stigma or the dash over vein 1. Antennae short, less than $\frac{1}{2}$ costa. F 10 mm. Uncus slender, sides straight, end rounded.

pygmaeus. 2 subspecies (doubtfully separable).

(a). Generally paler and better marked.

Subsp. *pygmaeus* Fabricius, 1775, India.

B.M. 42 ♂♂, 23 ♀♀ South India (N. Kanara. Coorg. Nilgiris. Calicut. Mysore).

(b). Generally darker and poorly marked.

Subsp. *indistincta* Moore, 1878 : ♂ Salween, Burma : type B.M. Figured El. & Edw., *Lep. Ind.*, and Seitz.

B.M. 2 ♂♂ Chittagong. ♂, 2 ♀♀ Assam (Nagas, Khasi). 31 ♂♂, 17 ♀♀ Burma to Mergui. ♂, ♀ Siam (Peninsular Siam. Singla, Kampengpet). (♂ from Malaya, Perlis, in Coll. Corbet.)

NOTES ON THE GENUS *DIXEIA* TALBOT, WITH DESCRIPTIONS OF NEW FORMS (LEP. RHOP. PIERIDAE)

By G. TALBOT, F.R.E.S.

HAVING arranged the material of this genus in the British Museum and in the Hope Dept. at Oxford, it was found that conceptions of the genus required amendment. It was found also that a number of forms seemed to require names; 16 new ones are described in the present paper. In the *Lep. Cat.* 53, 16 species are listed. In the present paper only 7 are recognised. The chief modification has been made in the merging of the forms *doxo* (Godt.), *charina* (Bdv.), and *narena* (Gr.-Sm.) to form a single species possessing 11 subspecies. The genitalia and scent-scales of some of these forms have been studied by Dixey, 1918, *Trans. ent. Soc. Lond.* 1918 : 191-208. The taxonomic value attached to geographical variation has undergone some change in recent years, especially with increased knowledge of distribution.

The present paper comprises (a) Systematic List; (b) keys to the species and forms; (c) new subspecies and forms.

All references not given will be found in Talbot, 1932, *Lep. Cat.* 53 : 202-207; 1935, *id.*, 66 : 633-635.

The author is indebted to the Trustees of the British Museum, and to Professor G. D. Hale Carpenter of the University Museum, Oxford, for facilities accorded for study.

ABBREVIATIONS USED.

Fw.	Fore-wing.	S-m.	Submarginal.
Hw.	Hind-wing.	Dc.	Discocellular.
Ups.	Upperside.	Udc.	Upper discocellular.
Uns.	Underside.	Mdc.	Middle discocellular.
Gr.-col.	Ground-colour.	Ldc.	Lower discocellular.
P.-d.	Post-discal.	Nom.	Nominotypical.

SYSTEMATIC LIST.

The letters B.M.T. placed after the name indicates that the type is in the British Museum (Natural History).

Forms described as new in the present paper are indicated by an asterisk.

1. *cebron* (Ward, 1871). B.M.T.

*♀ form *usitatus* Talb. B.M.T.

*♀ form *aurantiaca* Talb. B.M.T.

Ivory Coast to Cameroons.

2. *capricornus capricornus* (Ward, 1871). B.M.T.

Form *nusprica* (Suffert, 1904). B.M.T.

*♂ form *signata* Talb. B.M.T.

Ivory Coast to Cameroons.

capricornus falkensteini (Dewitz, 1879).(♂ = *lindneri* (Dewitz), 1879).

Gaboon to Angola.

3. *dixeyi* (Neave, 1904).

Uganda; south-western Abyssinia.

4. *orbona orbona* (Geyer, 1832) (♀ = *larima* (Boisduval), 1836). ? B.M.T.
Senegal to Cameroons.*orbona vidua* (Butler, 1899). B.M.T.♀ form *nigricans* (Aurivillius, 1910).♀ form *abyssinibia* (Strand, 1911). ? a *vidua* form.♀ form *primulina* (Joicey & Talbot, 1921). B.M.T.♀ form *griseovenata* (Neustetter, 1927).♀ form *aurantium* (Ungemach, 1932).♀ form *albida* (Ungemach, 1932).♀ form *rubescens* (Ungemach, 1932).*♀ form *semialba* Talbot. B.M.T.*♀ form *semiochracea* Talbot. B.M.T.

Abyssinia, Sudan, Uganda, eastern Congo, Kenya, Tanganyika Territory, Katanga, Northern Rhodesia.

5. *pigea* (Boisduval, 1836).Form *rubrobasalis* (Lanz, 1896) (♂ = *astarte* (Butler), 1900). B.M.T.♀ form *vulgaris* (Ungemach, 1932). ? = *rubrobasalis*.♀ form *pigea* (Boisd., 1836).Dry-season form *alba* (Wallengren, 1857).♀ form *saalmülleri* (Aurivillius, 1898). ? a *pigea* form.♀ form *nitida* (Aurivillius, 1898).♀ form *kueckeni* (Suffert, 1904). B.M.T.♀ form *wagneri* (Suffert, 1904). ? a *pigea* form.♀ form *lathyana* (Strand, 1909) (= *lathyi* (Hulstaert), 1924).♀ form *elia* (Strand, 1911).♀ form *leplaei* (Hulstaert, 1924).♀ form *reducta* (Hulstaert, 1924).♀ form *lutea* (Ungemach, 1932).♀ form *rubritincta* (Ungemach, 1932) (? = *saalmülleri* (Auriv.)).♀ form *citrina* (Romieux, 1934) (= *lathyi* (Ungem.), non Hulst.).*Pieris pigea* ab. *citrina*, Mitt. Schweiz. ent. Ges. 16 : 140 (Belgian Congo).*♀ form *citreus* Talbot. B.M.T.*♀ form *erubescens* Talbot. B.M.T.*♀ form *luteola* Talbot. B.M.T.*♀ form *lutescens* Talbot. B.M.T.

South Africa to Abyssinia, west to Congo and Angola; Cameroons (rare).

6. *spilleri* (Spiller, 1884).♀ form *gallenga* (Grose-Smith, 1887). B.M.T.*♀ form *flavalba* Talbot. B.M.T.

Natal to Tanganyika Territory and eastern Kenya.

7. *doxo doxo* (Godart, 1819) (= *voltaensis* (Talb.), 1929). B.M.T.

Dry-season form *minor* (Talbot, 1929). B.M.T.

Western Sudan to Senegal, Haute Volta, Gold Coast (Northern Territory).

doxo venatus (Butler, 1871). B.M.T.

*Dry-season form *desertorum* Talbot. B.M.T.

South-western Abyssinia; southern Sudan.

doxo alberta (Grünberg, 1911).

Eastern Congo (Mpororo district) and north-western Tanganyika Territory.

**doxo costata* Talbot. B.M.T.

Northern Tanganyika Territory to western Kenya and northern Uganda.

doxo pulverulenta (Dixey, 1929).

Northern Kenya (Mt. Kulal).

doxo liliana (Grose-Smith, 1889). B.M.T.

Dry-season form *gerda* (Grose-Smith & Kirby, 1893). B.M.T.

*Dry-season form *transiens* Talbot. B.M.T.

*Wet-season form *immaculata* Talbot. B.M.T.

♂ form *nigropunctata* (Sharpe, 1890). B.M.T.

*♀ form *ochreata* Talbot. B.M.T.

Eastern Kenya.

doxo dagera (Suffert, 1904). B.M.T.

Form *anali* (Suffert, 1904). B.M.T.

Eastern Tanganyika Territory.

**doxo parva* Talbot. B.M.T.

*Dry-season form *inspersa* Talbot. B.M.T.

Rhodesia and Nyasaland.

doxo simāna (Hopffer, 1857).

Portuguese East Africa.

doxo charina (Boisduval, 1836).

Dry-season form *anactorie* (Doubleday, 1842).

Natal and Cape Colony.

doxo narena (Grose-Smith, 1898). B.M.T.

Form *lambertoni* (Le Cerf, 1921).

Southern Madagascar.

Species removed.

Pinacopteryx helena Grose-Smith, 1898, Nov. Zool. 5 : 350 (♂, Kavirondo).

The type, in the Tring Museum, was kindly examined by Mr. F. W. Goodson, who states that it is a specimen of *Colotis elgonensis* (Sharpe, 1891).

Key to species of *Dixeia*.

Males.

- 1 (3). Ups. fw. basal area lemon-yellow.
2. Ups. fw. costal border darkened. *cebron* (Ward).
3. Ups. fw. basal area not coloured differently from rest of wing.
- 4(16). Ups. fw. entirely white, with a marginal dark border or marginal dots.
- 5(17). Uns. fw. without a p.-d. spot in area 3.
- 6 (9). Uns. fw. marginal spots well developed.
- 7 (8). Uns. fw. not orange at base. Uns. hw. yellowish-buff
capricornus (Ward).
8. Uns. fw. orange-yellow at base *dixeyi* (Neave).
- 9(11). Uns. fw. marginal spots small or vestigial.
10. Hw. marginal spots on ups. or uns. *orbona orbona* (Geyer).
- 11(12). Uns. fw. marginal spots usually absent.
- 12(14). Ups. fw. marginal narrow dark border rarely maculate.
13. Uns. hw. usually immaculate or with vestigial s.-m. spots
orbona vidua (Butl.).
14. Ups. fw. a marginal row of vein-dots, sometimes anteriorly coalescent.
15. Uns. hw. marginal dots usually present, except in dry-season specimens
pigea (Boisd.).
16. Ups. both wings lemon-yellow *spilleri* (Spiller).
- 17(18). Uns. fw. usually a p.-d. spot in area 3.
18. Ups. fw. costal border and base of wing more or less darkened. Both
wings with veins often darkened *doxo* (Godt.).

Females.

(See separate keys to forms of *orbona* and *pigea*).

- 1 (8). Ups. fw. a prominent p.-d. spot in area 3, longer than broad, 3 to 5
mm. long, sometimes prolonged to cell.
- 2 (6). Ups. fw. marginal dark border usually continuous to tornus.
3. Ups. fw. usually without a subapical spot in area 5.
- 4 (5). Ups. fw. white or yellow *cebron* f. *usitatus* Talb.
5. Ups. fw. orange *cebron* f. *aurantiaca* Talb.
6. Ups. fw. marginal dark border usually maculate or at least broken in
area 2.
7. Ups. fw. a subapical spot in area 5 and usually a small one in 6
capricornus (Ward).
- 8(15). Ups. fw. without a p.-d. spot.
- 9(10). Both wings with prominent marginal spots *dixeyi* (Neave).
10. Both wings without marginal spots.
- 11(14). Ups. lemon-yellow.
12. Uns. hw. ochraceous-yellow with s.-m. brown spots
spilleri f. *spilleri* (Spiller).
13. Uns. hw. ochraceous-brown without s.-m. spots
spilleri f. *gallenga* (Gr.-Sm.).
14. Ups. fw. white *spilleri* f. *flavalba* Talb.
15. Ups. fw. a p.-d. spot in area 3, small and rounded, not reaching 3 mm.
in diameter.

- 16(18). Small species; fore-wing 21-25 mm.
 17. Ups. resembles male (fw. unmarked, with or without marginal narrow border or spots), or fw. veins darkened in marginal area. Fw. usually more or less dusky or else the p.-d. spot minute or vestigial; marginal border usually maculate *orbona* (Geyer).
 18. Large species; fw. 26-32 mm.
 19. Ups. fw. usually not dusky, nor with veins darkened in marginal area.
 20. Ups. fw. marginal border maculate; uns. often a basal red area *pigea* (Boisd.).
 21. Ups. fw. marginal border continuous to tornus, or at least to vein 4, rarely maculate (dry-season specimens). Uns. never with basal red. Wings always white *doxo* (Godt.).

Dixeia orbona (Geyer).

Key to ♀ forms.

- 1 (9). Ups. fw. white and more or less dusky.
 2 (8). Ups. fw. without a rosy basal area.
 3 (7). Ups. fw. the s.-m. spot in area 4 absent or vestigial.
 4 (5). Ups. fw. cell usually darkened; no marginal vein-streaks. Hw. marginal spots prominent *orbona* (Geyer).
 5 (6). Ups. fw. usually with marginal vein-streaks, except in dry-season specimens. Hw. marginal spots usually absent or vestigial *vidua* (Butl.).
 6. Ups. fw. much darkened. Hw. more or less darkened *nigricans* (Auriv.).
 7. Ups. both wings dusky in basal half. Fw. with s.-m. spots in areas 3 to 6 *abyssinibia* (Strand.).
 8. Ups. fw. a rosy basal area; veins mostly dusky *griseovenata* (Neust.).
 9(14). Ups. fw. white, not dusky, no marginal vein-streaks.
 10(11). Ups. fw. basal area orange-red or orange-yellow *rubescens* (Ungem.).
 11(12). Ups. hw. ochraceous *semiochracea* Talb.
 12(13). Ups. hw. lemon-yellow *semialba* Talb.
 13. Ups. both wings white *albida* (Ungem.).
 14(15). Ups. both wings primrose-yellow *primulina* Talb.
 15. Ups. both wings orange to ochraceous-yellow. Fw. basal area more or less orange-red *aurantium* (Ungem.).

Dixeia pigea (Boisd.).

Key to ♀ forms.

- 1(16). Ups. fw. gr.-col. white to yellowish-white.
 2(12). Uns. fw. a basal red area.
 3 (9). Ups. fw. a basal rosy area showing through from uns.
 4. Ups. fw. basal red area not extended beyond cell.
 5 (8). Uns. hw. ochraceous-yellow.
 6 (7). Both wings marginal spots small *rubrobasalis* (Lanz); *vulgaris* (Ungem.).
 7. Both wings marginal spots large, more or less united on fw. *kueckeni* (Suff.).
 8. Uns. hw. pearly-white *nitida* (Auriv.).
 9. Ups. fw. with basal red scaling, extending over the cell.
 10(11). Ups. fw. basal red not extended beyond cell *rubritincta* (Ungem.); *saalmülleri* (Auriv.).
 11. Ups. fw. basal red extended beyond the cell *erubescens* Talb.
 12(13). Uns. fw. basal area orange-yellow. Hw. ochraceous-yellow in distal area *wagneri* (Suff.).

13. Uns. fw. basal area of the gr.-col.
- 14(15). Uns. hw. ochraceous-yellow or white *pigea* (Boisd.).
15. Uns. hw. lemon-yellow *citreus* Talb.
- 16(24). Ups. fw. lemon-yellow.
- 17(23). Fw. with basal red or orange.
- 18(19). Ups. basal areas orange-yellow *elia* (Strand).
- 19(22). Uns. fw. a basal orange area.
- 20(21). Both wings with prominent marginal spots *leplaei* (Hulst.).
21. Both wings with marginal spots vestigial or absent *reducta* (Hulst.).
22. Fw. on both sides with basal area red *lutea* (Ungem.).
23. Fw. without basal red or orange *citrina* (Romieux).
24. Ups. ochraceous-orange to orange-red.
- 25(26). Ups. ochraceous-orange; marginal spots prominent *luteola* Talb.
26. Ups. orange to orange-red. Hw. marginal spots vestigial or absent
lathyana (Strand).

New subspecies and forms of the genus *Dixeia* Talbot.

***Dixeia cebron* (Ward) ♀ form *usitatus* f. n.**

Pieris capricornus Aurivillius (*non* Ward), 1910, in Seitz, *Macrolep. World* 13 : 45, t. 14b (♀).

♀. Ups. fw. lemon-yellow or white; cell blackish-brown; a large, p.-d., round, blackish-brown spot in area 3; an inner blackish-brown stripe filling areas 1a and 1b from base to near tornus; marginal dark border broader from apex to vein 4, much narrower from vein 4 to tornus, its edge even along the broader part, but below vein 4 it is more or less dentate on the veins; spot in area 3 sometimes joined to cell-stripe; some specimens have a subapical spot as in *capricornus* female. Hw. lemon-yellow to whitish, sometimes suffused with dusky scaling; a s.-m. series of well-defined spots; a marginal row of round spots, larger than the s.-m. ones.

Uns. fw. white; apical and basal areas more or less tinged greenish-yellow; marginal row of small rounded spots; other markings as on ups. but reduced. Hw. pale ochraceous-yellow; marginal spots usually larger than on fw.; s.-m. spots present in areas 1c to 6.

Habitat.—IVORY COAST (type). Both sexes from GOLD COAST, NIGERIA, ASHANTI and CAMEROONS. One pair *in cop.* from Ashanti.

The female of the allied *capricornus* (Ward) is very similar, but usually larger, and on fw. ups. with a subapical black spot.

***Dixeia cebron* (Ward) ♀ form *aurantiaca* f. n.**

Pieris cebron Aurivillius, 1910, in Seitz, *Macrolep. World* 13 : 45, t. 14c.

♀. Ups. fw. orange-yellow; a short apical cell-streak; p.-d. spot smaller than in *usitatus*; a similar p.-d. spot below vein 2, divided by vein 1a; dark marginal border as in the allied form, but posteriorly its edge only feebly dentate. Hw. white without dusky scaling; s.-m. and marginal spots as in allied form.

Uns. fw. orange-yellow; p.-d. spot in area 3 well defined, other markings vestigial. Hw. white with yellow tinge on inner and outer areas; area 8 orange-yellow; s.-m. spots as on ups.; marginal spots minute.

Habitat.—One specimen (type) without locality, ex Coll. C. Ward (via Coll. Oberthür), and figured in Ward (1873, *African Lep.* pl. iii, figs. 4, 5, Cameroons). Also 1 ♀, "Cameroons" (ex Coll. Grose-Smith).

The Grose-Smith specimen has reduced black markings on fw.; below vein 4 the marginal border is broken up into spots as in the female of *capricornus*;

p.-d. spot small and more rounded; no cell mark. Hw. tinged yellow. Uns. as in the type.

***Dixela capricornus* (Ward) ♂ form *signata* f. n.**

♂. Differs from the nom. form only on the uns. Fw. a p.-d., small, round spot in area 3; occasionally also a smaller spot in area 1b, just below vein 2. Hw. paler than in most specimens of the nom. form; p.-d. small spots in areas 1c, 2 to 6, those in 3 and 5 more distinct, the one in 4 vestigial, the others usually minute.

Habitat.—GOLD COAST, Enchi (*Capt. B. D. Peake*) (type); IVORY COAST, Dimbrok (*I. Dyot*, 1914), 1 ♂; ASHANTI, Coomassie, 3 ♂.

***Dixela orbona vidua* (Butler) ♀ form *semialba* f. n.**

♀. Ups. fw. white or yellowish; a marginal narrow border and prominent p.-d. small spot in area 3 as in other forms. Hw. lemon-yellow with marginal dots.

Uns. fw. white; apical area ochraceous-yellow; p.-d. spot as on ups.; trace of a smaller p.-d. spot below vein 2. Hw. of same colour as apex of fw.; s.-m. and marginal vestigial dots.

Habitat.—KENYA: Lumbwa, 5.vii.1923 (*G. W. Jeffery*) (type); *id.*, 27.xi.1921, 1 ♀.

A form similar to this occurs in *pigea* (Boisd.).

***Dixela orbona vidua* (Butler) ♀ form *semiochracea* f. n.**

♀. Ups. fw. white, basal area slightly rosy; outer margin tinged yellow; apex narrowly darkened; five small marginal spots; p.-d. small spot in area 3. Hw. ochraceous-yellow; marginal dots minute; veins white.

Uns. fw. white; cell orange to beyond middle; apical area ochraceous-yellow; p.-d. spot as above. Hw. ochraceous-yellow; s.-m. and marginal dots minute; area 8 orange; some orange suffusion below cell.

Habitat.—S.E. CONGO: Katanga, Lufira Valley, Kikura River, 5.v.1919 (*T. A. Barns*) (type). NORTHERN RHODESIA, Chosi River, 20.viii.1916 (*T. A. Barns*), 1 ♀.

The last-mentioned specimen has fw. markings vestigial on ups.

***Dixeia pigea* (Boisduval).**

The nom. form represents the normal wet-season form. The extreme wet-season form is represented by *rubrobasalis* (Lanz), of which *astarte* (Butl.) is the male; *kueckeni* (Suff.) is a slightly differentiated ♀ form. The dry-season form is *alba* (Wlgr.).

The female holotype of *pigea* was not found in Coll. Oberthür; the single specimen from Coll. Boisduval does not agree with the original description.

Although the female of *pigea* is represented by at least fifteen forms, the male does not appear to be geographically variable.

***Dixela pigea* (Boisduval) ♀ form *citreus* f. n.**

♀. Ups. fw. white; dark markings heavy or slight; type and another with basal dusky area to end of cell, filling area 1b to the p.-d. spot, and area 1a to the tornus; marginal dark maculate border with spots on veins 1a, 2, 3 and 4; a wider apical border. Hw. ochraceous-yellow to lemon-yellow, with the usual marginal spots.

Uns. fw. white, yellowish at base; apical area ochraceous-yellow; marginal dots; p.-d. spots in areas 3 and 1b, sometimes vestigial. Hw. ochraceous-yellow; s.-m. and marginal spots more or less defined.

Habitat.—KENYA: Sagalla, 9.i.1915 (*K. St. A. Rogers*) (type); Dabida, 3500 feet, 16.xii.1901 (*K. St. A. Rogers*), 1 ♀; also in Hope Dept. from Sagalla, 5 ♀. TANGANYIKA TERRITORY: Mhonda, 1 ♀; Usambara, 3 ♀. UGANDA: Kumi (*H. B. Morony*), 1 ♀ in Hope Dept. (fw. with a yellow tinge on both sides); Kakindu Hill, 1° 10' S., 31° 30' E., 1.v.1915 (*G. D. H. Carpenter*), 1 ♀ in Hope Dept.

***Dixeia pigea* (Boisduval) ♀ form *luteola* f. n.**

Pinacopteryx astarte Butler, 1900, *Proc. zool. Soc. Lond.* 1899: 971, pl. lxx, fig. 7 (♀, Tana River).

♀. Somewhat resembles *lathyana* (Strand, 1909) but is larger and more strongly marked and probably represents a wet-season phase.

Ups. ochraceous-orange to ochraceous-yellow. Fw. with or without basal orange-red suffusion; dark marginal border or marginal spots; p.-d. spot in area 3. Hw. s.-m. spots prominent.

Uns. somewhat paler. Fw. usually with basal orange-red area or this area of a deeper yellow; marginal dots small or vestigial. Hw. marginal spots smaller than on ups.; s.-m. dots few and indistinct.

Habitat.—TANGANYIKA TERRITORY: M'Pala (*R. P. Guillelé*) (type). KENYA: Tana River (♀ described by Butler, *loc. cit.*); "Brit. E. Afr.," 1 ♀ (paler ochraceous). UGANDA: Eastern Busoga, 3800–4000 feet, 28.vii.–1.viii.1911 (*S. A. Neave*), 1 ♀. CONGO: Near Elizabethville, 4.iii.1926 (*Major F. G. Jackson*), 1 ♀; "Congo," 1 ♀ (paler ochraceous); Ribé (ex Coll. Ward), 1 ♀ (paler ochraceous). RHODESIA: North-western Rhodesia, Chisanga, 27° 22' E., 13° 32' S., 14.v.1915 (*H. C. Dollman*), 1 ♀; Northern Rhodesia, Chosi River, 12.x.1917 (*T. A. Barns*), 1 ♀; Ndola, 3.vi.1938 (*R. W. Barney*), 2 ♀; Luanshya, 17.iii.1938 (*R. W. Barney*), 1 ♀; *id.*, 15.xii.1940 (*R. W. Barney*), 1 ♀.

***Dixeia pigea* (Boisduval) ♀ form *lutescens* f. n.**

♀. Ups. creamy-white tinged yellow. Fw. marginal spots prominent as in typical white form. Hw. marginal dots sharply defined; outer margin narrowly bordered yellow from vein 1a to vein 4 at least.

Uns. hw. and apical area of fw. ochraceous-yellow.

Habitat.—South-western Uganda: Kakindu Hill, 1° 10' S., 31° 30' E., on a grassy plain, 13.vii.1915 (*G. D. H. Carpenter*) (type); Kigezi district, 3000–3200 feet, near mouth of Ntungwe River, Lake Edward, 19–24.ix.1922 (*G. D. H. Carpenter*), 1 ♀.

***Dixeia pigea* (Boisduval) ♀ form *erubescens* f. n.**

♀. Ups. creamy-white. Fw. marginal narrow border continuous or maculate; basal red area usually appearing from uns. Hw. usually immaculate.

Uns. dark markings not prominent. Fw. with extensive basal orange-red area including all or most of the cell; sometimes some scattered red scaling over distal area of wing. Hw. yellowish or distinctly pale yellow.

Habitat.—UGANDA: Kerinya Peninsula, 2 miles south of Jinja, Usoga, 16–31.i.1911 (*G. D. H. Carpenter*) (type). KENYA: Mau Escarpment; Nairobi

district; Mt. Kenia; Kikuyu; Sagalla (one), 11 ♀. All in the Hope Dept. In the Brit. Mus. from Hoyesbridge, iv-v.1930 (*Mrs. E. Barns*), 1 ♀ (damaged).

Apparently a dry-season form. Similar to *rubrobasalis* (Lanz), in which, however, the dark markings are much more developed. In the Hope Dept. there is a specimen taken *in cop.* with a dry-season male.

***Dixela spilleri* (Spiller) ♀ form *flavalba* f. n.**

♀. Similar to *gallenga* (Grose-Smith), which has heavier dark markings and is dull ochraceous. The nom. ♀ is yellow like the ♂.

Ups. fw. greyish-white or with a yellow tinge; outer border about twice as wide as in ♂, wider than in typical ♀, and continuous to tornus; rarely a vestigial p.-d. spot in area 3, and traces of subapical spots in 5 and 6; costal border darkened in some specimens. Hw. very pale greenish-yellow, or dull white with basal yellow; outer marginal spots usually present, but diffuse and sometimes absent.

Uns. dull white to creamy-white, fw. lighter. Fw. with apical yellow tinge and basal yellow suffusion. Hw. with slight basal yellow suffusion and p.-d. dark spots as in typical ♀.

Habitat.—Kenya: Voi district, 8-10.ii.1912 (*S. A. Neave*) (type, taken *in cop.*). Also a series from the same area in both the Brit. Mus. and Hope Dept.

***Dixela doxo venatus* (Butler) form *desertorum* f. n.**

This is the dry-season form.

♂. Ups. fw. marginal black reduced; basal black scaling absent or reduced. Hw. marginal spots absent or vestigial.

Uns. fw. with or without apical dull ochraceous suffusion; p.-d. dot in area 3; veins not darkened. Hw. white or yellowish; veins not darkened; no markings or vestiges of p.-d. and marginal spots.

♀. Ups. creamy-white or slightly ochraceous. Fw. outer border usually brownish; p.-d. spot smaller; basal dark scaling usually absent or slight. Hw. veins not darkened; marginal dots may be present.

Uns. hw. and fw. apical area, darker or paler brownish-ochraceous; veins not darkened; dark markings more distinct than in ♂ but may be quite absent in pale specimens; darker specimens with hw. p.-d. line prominent.

Habitat.—Sudan: District of the White Nile (*G. B. Longstaff*) and Nuba Mtns. chiefly. Types in Hope Dept., and a long series of both seasonal forms. In the Brit. Mus. one ♀ from White Nile, 6° 8' N., Malek, 11.ii.1912 (*G. B. Longstaff*).

***Dixela doxo liliana* (Grose-Smith).**

Dry season form *transiens* f. n. and wet season form *immaculata* f. n.

This pair of forms seems to represent a *charina*-like race that flies with typical *liliana*. The forms *liliana* (f. typ.), *gerda* and *transiens*, and also the ♀-f. *ochreatea* all occur at Voi. *F. transiens* appears to be rare, for there are only three specimens in the Brit. Mus.

Dry-season form *transiens*.

♂. Ups. resembles *charina* (Boisd.). Fw. with a more prominent spotted marginal border, much narrower than in f. *gerda* (Smith & Kirby), the apex black to vein 7, and a row of four or five small spots on veins 2 to 6.

Uns. fw. usually with a p.-d. spot in area 3; both wings usually with a *dc* dot. Hw. as in *charina* dry form.

♀. Ups. fw. outer dark border heavier than in male, the spots composing it forming a continuous band; p.-d. spot somewhat larger than in *charina*.

Uns. hw. and apical area of fw. pale brownish-ochraceous, not blackish-ochraceous as in *charina*.

Wet-season form *immaculata*.

♂. Ups. as in the dry phase. Uns. unmarked except for a minute *dc* dot on hw.

♀. Very similar to *charina*. Ups. fw. with dark markings heavier. Uns. somewhat as in *gerda* (Smith & Kirby). Hw. and apical area of fw. pale ochraceous-yellow. Fw. p.-d. spot absent or vestigial.

Habitat.—Eastern Kenya; north-eastern Tanganyika Territory. Form *transiens*.—KENYA: Mukaa Hills, about 30 miles east of Machakos, c. 5800 feet, 9.vi.1908 (*K. St. A. Rogers*) (♂ type, in Hope Dept.); *id.*, 12.vi.1908 (♀ allotype, in Hope Dept.); *id.*, 19.iii.1909, 1 ♀ in Hope Dept. Thiba River, between Embu and Fort Hall, c. 4200 feet, 10.ii.1909 (*K. St. A. Rogers*), 1 ♂ in Hope Dept. Voi Plantations, 2.iii.1912 (*C. Montague Smyth*), 1 ♂ in Brit. Mus.; *id.*, 10.ii.1912, 1 ♂ in Brit. Mus.; Tana River, Maranga, 3800 feet, 16.i.1899 (*R. Crawshay*), 1 ♂ in Brit. Mus. The three latter specimens are somewhat like *simana* (Hopffer), but with fw. border slightly heavier and *dc* dot on both wings more prominent. TANGANYIKA TERRITORY: Kiwanga, April, 1901 (ex Coll. Brodie), 1 ♂ in Hope Dept.

Form *immaculata*.—Kenya: Mombasa Island, sea front, 3.vi.1919 (*G. D. H. Carpenter*), 1 ♂; *id.*, 10.vi.1919 (♂ type); *id.*, 8.vi.1919, 1 ♂; *id.*, 3.vi.1919 (♀ allotype). All in Hope Dept.

Dixeia doxo lilliana ♀ form *ochreata* f. n.

♀. Markings as in f. *lilliana* (Gr.-Sm.). Ups. pale ochraceous-yellow.

Uns. pale ochraceous, with or without speckling characteristic of dry-season forms.

Habitat.—KENYA: Voi, 8–10.ii.1912 (*S. A. Neave*) (type and two others); Taveta, 1 ♀. In Brit. Mus. In Hope Dept. from Rabai and Jilore, 3 ♀. TANGANYIKA TERRITORY: Morogoro, 1 ♀ in Brit. Mus. Also in Brit. Mus. 1 ♀ labelled "Natal".

Dixeia doxo costata subsp. n.

♂. Ups. resembles the subspecies from Nyasaland and Rhodesia; veins darkened. Fw. with basal dusky scaling more or less developed, at least below cell; marginal border narrow, reaching to vein 3. Hw. without marginal spots or with faint dots.

Uns. white. Fw. as in the Nyasaland subspecies but *dc* dot and p.-d. spot more strongly developed. Hw. somewhat as in *alberta* Grünb.; veins not edged black, only darkened; a p.-d. line as in *alberta* but more maculate, accentuated in areas 6 and 7, and more or less developed; median dusky stripe, from base to p.-d. line on vein 4, more or less distinct; a *dc* dot; marginal dots absent or vestigial.

♀. Ups. similar to the Nyasaland subspecies. Fw. marginal border broader in specimen from Tanganyika Territory, almost touching p.-d. spot; basal dusky scaling more strongly developed than in specimens from Nyasaland.

Uns. fw. buff-white, more yellow over apical area. Hw. pale ochraceous. Markings of both wings as in male.

The dry-season form is not well differentiated. Ups. with the usual reduction of black markings and black scaling. Uns. hw. and fw. apical area more or less ochraceous with more or less brown speckling.

Habitat.—TANGANYIKA TERRITORY: District of Great Craters, Kondoa Irangi, 4000 feet, February and March 1921 (*T. A. Barns*), 2 ♂, 8 ♀ (wet f.), 1 ♀ (dry f.) (♂♀ types, March); Kassanga, Lake Tanganyika, 2 ♂. KENYA: S. Kavirondo, Upper Kuja Valley, 4200 feet, May 1911 (*S. A. Neave*), 3 ♂ (wet f.), 3 ♀ (dry f.); Mumias, Kisumu Road, 3800–4800 feet, June 1911 (*S. A. Neave*), 1 ♀ (wet f.); Port Ugowe, 23.ii.1900 (*H. Johnston*), 1 ♀ (dry f.); Fort Hall to Embu road, 5000 feet, February 1911 (*S. A. Neave*), 1 ♀ (dry f.); Nairobi to Fort Hall road, 4500–5000 feet, January 1911 (*S. A. Neave*), 2 ♀ (dry f.); Muthambi River, Maranga, 4500 feet, 10.i.1899 (*A. Crawshaw*), 1 ♀ (dry f.). UGANDA: Victoria Nile, near Masindi, 3400 feet, 20–22.xii.1911 (*S. A. Neave*), 4 ♂ (dry f.); Semliki Plains, near S. shore of Lake Albert, 2200 feet, 25–27.xi.1911 (*S. A. Neave*), 1 ♂ (wet f.); “Victoria Nyanza,” 2 ♂ (wet f.); Ripon Falls, 7.xi., 1 ♀ (wet f.); Jinja, 3800 feet, July 1911 (*S. A. Neave*), 1 ♀ (dry f.); “Uganda,” 1 ♀ (extreme dry f.).

Dixeia doxo parva subsp. n. and form *inspersa* f. n.

Wet-season form *parva*.

♂. Ups. resembles *liliana* Gr.-Sm., with similar darkened veins and basal dusky scaling. Fw. dark border somewhat narrower, its edge straight, not crenulate as in *liliana*.

Uns. resembles form *gerda* Sm. & Kby. Fw. p.-d. spot in area 3 vestigial or absent. Hw. unmarked or with traces of s.-m. markings. Both wings with a distinct *dc* dot.

♀. Somewhat resembles paler specimens of *gerda*. Ups. fw. p.-d. spot in area 3 smaller; spot on inner margin usually absent, otherwise vestigial. Hw. without s.-m. markings; marginal spots small or absent.

Uns. fw. white; apical area yellowish; p.-d. spot small, rarely as large as in *liliana* forms. Hw. white, more or less tinged ochraceous; markings as in *liliana* but fewer.

Length of fw.: ♂♀, 21–23 mm. In *liliana* ♂♀, 23–27 mm.

Dry-season form *inspersa*.

♂. Ups. veins usually much less darkened than in wet form. Fw. dark border usually brownish-black; basal and costal dusky scaling slight.

Uns. fw. p.-d. spot small and diffuse as in some females of wet form; *dc* dot as in wet form; apical area finely speckled with ochraceous-brown. Hw. as apical area of fw., some specimens less strongly speckled than others; s.-m. small spots more or less distinct; *dc* dot as in wet form.

♀. Ups. with slight yellow tinge. Fw. markings as in wet form; marginal border somewhat narrower. Hw. usually unmarked or with marginal dots.

Uns. resembles the ♂.

Habitat.—Northern and Southern Rhodesia: wet form, 9 ♂, 5 ♀; dry form, 12 ♂, 11 ♀ (? in this area 3 females labelled “Taguela”). Nyasaland: wet form, 5 ♂, 2 ♀; dry form, 9 ♂, 3 ♀.

Form *parva*, ♂ holotype: S. Rhodesia, Lomagundi, 11.ii.1908 (*H. R. Stevenson*); ♀ allotype: Mashonaland, Umtali, December 1900 (*G. A. K. Marshall*).

Form *aspersa*, types: Mashonaland, Umtali, August 1908 (*Miss Fountaine*).

LESTES ALBOFASCIATA: A NEW SPECIES OF ODONATA FROM BURU ISLAND

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

IN the course of writing a monograph on the Legion *Lestes* Selys, I made a critical examination of my large collection of species from the Oriental region, and found among them a specimen labelled "Buru, Forster", which is undoubtedly a species new to science. This specimen was passed on to Dr. Laidlaw, I believe, some years ago, and I had formerly misread the label as "Borneo".

This new species belongs to the large complex *praemorsa* which, I find, falls naturally into two sections according to whether the pectus of thorax and, more especially, the ventro-lateral border of the metepimeron is spotted with black or not. The new species belongs to the first category which includes not only species from the Orient, but also a small Ethiopian section, viz. *L. simulatrix* McLachlan, *L. tridens* McLachlan, *L. simulans* Martin and *L. pruinescens* Martin. The latter is, I think, merely the very adult form of *L. simulatrix* from Madagascar, or its continental form. I have named the new species *L. albofasciata* from the unique pale bluish-white fascia which traverses each side of the thorax, and its description follows:—

Lestes albofasciata sp. n.

Male. Abdomen 36 mm. Hind-wing 23 mm. (♀ unknown). Head: labium pale yellow, labrum, bases of mandibles and genae pale turquoise blue; ante- and post-clypeus black, the latter with a submedial spot of blue on each side; rest of head dull black, including behind the eyes, save for a small quadrate spot of yellow bordering the outer side of each lateral ocellus. Prothorax pale bluish with a broad middorsal black stripe, the median suture anteriorly yellow just behind the anterior lobe. Laterally a narrow black stripe broadening and forking deeply anteriorly. Thorax pale bluish-white marked very broadly with sharply defined coal-black stripes and areas, that on the dorsum being dark blue metallic. Mid-dorsum with the conventional *praemorsa* crenulate stripes which, however, are confluent in the middle line and broader than in any other known species, extending in places almost to the humeral suture and the indentations much flattened out. Laterally a small black spot on the superior end of humeral suture, another adjacent to the lower end of this suture, a small spot on the spiracle and the whole of the lower sides and beneath. The upper anterior limit of this black fascia is very clearly defined and begins just at the level of the incomplete suture; a small spot of the ground-colour and some irregular unguate indentations posteriorly are the only relief to this extensive black area (fig. 1). Legs very long and slim, yellow with narrow black stripes on the outer and extensor surfaces of femora, broad and confluent apically on the anterior pair. Wings hyaline: 13 and 15 postnodals in fore-wings, 14 and 15 in the hind pair. Pterostigma black, rather short, scarcely more than twice as long as broad, covering 2 cells, distal and proximal sides equally oblique. Abdomen black on dorsum, blue laterally and beneath, the black as a quadrate spot on dorsum of segment 1, not quite extending to apical border of segment, a broad thistle-head-shaped stripe on dorsum of segment 2, not quite extending to base of segment where a broadish blue annule thus separates the two first segments; segments 3 to 6 with narrow black apical rings and black dorsal bands which taper to a

point basally and broaden subapically to form broad subapical annules narrowly connected to the apical ones; segment 7 with a basal blue ring covering about one-fourth the

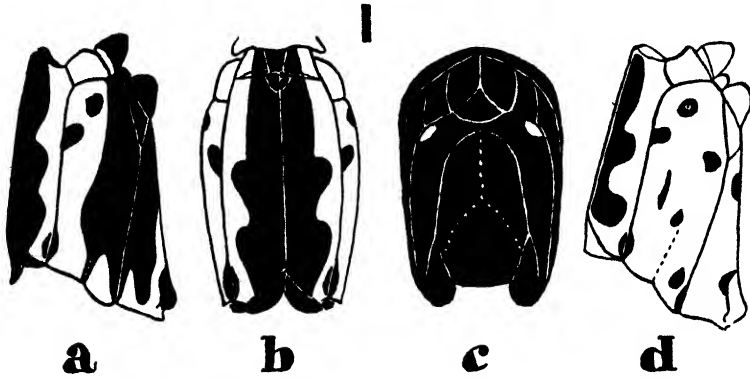


FIG. 1.—*Lestes albofasciata* sp. n. a. Right lateral view of thorax. b. Dorsal view of thorax. c. Pectus. d. *Lestes praemorsa* Selys, right lateral view of thorax to contrast with a.

segment; segments 8 to 10 entirely black. Anal appendages: superiors *entirely pale creamy yellow*, shaped very similar to those of *praemorsa* typica, about half as long again as segment 10, the inner plate narrower than in *praemorsa* and rather abruptly expanded



FIG. 2.—*Lestes albofasciata* sp. n. Dorsal view of tenth segment and anal appendages of male.

at the apical end which is very finely dentate. Apices evenly incurved and with a few bordering spines. Inferiors brownish, pale yellow at base and extreme apex, broad at base, mammilated at apex, not extending as far as the inner basal spine of superiors (fig. 2).

Habitat: Buru. The type will be deposited in the British Museum. The late Dr. Ris mentions specimens of *L. praemorsa* from Buru (1929, *Treubia*, 7 (Suppl.) : 141), but states that they do not differ from those from Sumatra. He mentions, however, that the superior anal appendages are entirely pale and that the pterostigma is shorter and blacker than usual, thus these may represent the sub-adult state of this new species. Owing to the extensive black fascia, it is impossible to say whether the usual ventro-lateral black spots on the lower border of metepimeron common to the first section of *praemorsa* are present or not.

MYRMECOLOGICAL GLEANINGS

By HORACE DONISTHORPE, F.Z.S., F.R.E.S.

IN the course of work during the last twelve months the following myrmecological matters, to which attention should be called, have come to notice.

FORMICIDAE.

PONERINAE.

1. *Ponera tortuolosa* Smith, 1858, *Cat. Hym. Brit. Mus.* 6 : 99, ♂, and *Ponera tortuolosa* Smith, 1863, *Journ. Proc. Linn. Soc. Lond. Zool.* 7 : 18, ♀♀. The first species, from Brazil, belongs to the subgenus *Gnamptogenys* Roger of *Ectatomma* Smith, and the second, from Ceram, is a subspecies of *Diacamma rugosum* Le Guil. Nevertheless as they were both originally described as *Ponera tortuolosa*, the latter insect requires a new name, for which I propose *D. rugosa* Le Guil, subsp. *smithi* nom. n.

2. *Rhytidoponera* (*Rhytidoponera*) *hilli* Crawley, 1915, *Ann. Mag. nat. Hist.* 15 : 131, ♀, and *Rhytidoponera* (*Chalcopynura*) *hilli* Clark, 1941, *Mem. Nat. Hist. Mus. Melbourne* 12 : 85, ♀, both from Australia. For the latter species I propose the name *R. (C.) clarki* nom. n.

MYRMICINAE.

3. *Acromyrmex* (*Acromyrmex*) *nobilis* Santschi. Santschi, in 1939, described this species twice, though not entirely in the same words, on four workers taken in Brazil. The descriptions may be found in "Études et Descriptions de Fourmis néotropiques," 1939, *Rev. Ent. Rio de J.* 10 : 317; and "Résultats

Scientifiques des Croisières du Navire—École Belg. 'Mercator,' " 1939, *Mem. Mus. Hist. nat. Belg.* (2) 15 : 164. I have ascertained that the former paper was published a few months earlier than the latter, therefore the original description occurs in the Rio de Janeiro publication.

FORMICINAE.

4. *Formica fervens* Drury, 1782,¹ *Ill. Nat. Hist. Ins.* 3 : 58, pl. 42, fig. 3, ♀, from Mexico, and *Formica fervens* Smith, 1857, *Journ. Proc. Linn. Soc. Lond. Zool.* 2 : 55, ♀, from Borneo. The former is an *Atta*, most probably *A. cephalotes* L., and the latter is a *Camponotus* (*Tanaemyrmex*) species, for which I propose the name **C. (T.) fervidus** nom. n.

5. Stitz, 1923, *Sitzber. Ges. naturf. Fr. Berlin* : 136, described a variety of *Polyrhachis* (*Myrmothrinax*) *thrinax* Roger under the name of *castanea* var. n. Santschi, 1928, *Tijds. v. Entom.* 71 : 140, sank this and renamed it *castanella* nom. n., because he said Stitz had already used the name *castanea* on page 128 of the same publication. On looking this up, I found that the insect described was not a *Polyrhachis* at all but *Camponotus* (*Myrmocantha*) *castanea* sp. n. Santschi's name *castanella* therefore sinks, but Stitz's name still sinks as there is a *Camponotus castaneus* Latreille, 1802, *Hist. Nat. Fourmis* : 118. I propose the name **castanicolus** nom. n., for Stitz's species.

6. *Echinopla rugosa* Er., André, 1891, *Mem. Soc. zool. France* 5 : 47, ♀, from Borneo, and *Echinopla rugosa* Stitz, 1938, *Sitzber. Ges. naturf. Fr. Berlin* : 110, ♀, from New Guinea. I propose the name **E. corrugata** nom. n. for the latter insect.

7. *Introduced Ants* :—In "British Ants" (2nd edn. 1927, p. 386), I gave a list of eleven ants enumerated by Forel as having become cosmopolitan, being introduced everywhere by shipping, and pointed out that all of these except three species had been found in Britain. Since this was written one of these three—*Solenopsis geminata* F.—has been found in some numbers in the propagating pits in Kew Gardens in 1932, both the winged sexes and also workers being present. Last year a certain number of workers of the first species in the list—*Odopotomachus haematodes* L.—were taken in a hot-house in Kew Gardens. This leaves only one species, *Mommorium floricola* Jerdon, to complete the series in this country.

Crustacea.

Isopoda.

8. *Platyarthrus hoffmanseggii* Brandt. J. L. Brooks in a paper—"Notes on the Ecology and the Occurrence in America of the Myrmecophilous Sowbug *Platyarthrus hoffmanseggii* Brandt," 1942, *Ecology* 23 : 427-37—records the first capture of this European myrmecophilous woodlouse in ants' nests in Connecticut. As the author suggests, it was probably accidentally introduced from Europe. Of the various experiments carried out by the author, the only definite result obtained was that *Platyarthrus* is attracted towards formic acid vapour, while *Oniscus asellus*, a non-myrmecophilous species, tends to avoid it.

¹ Emery (1922, *Gen. Ins.* 174c : 352) incorrectly quotes the date as "1872".

THE FORMS OF *ELYMNIAS HYPERMNESTRA* (L.) (LEP. RHOP.) IN THE MALAY PENINSULA

By A. Steven CORBET, D.Sc., Ph.D., F.I.C., F.R.E.S.

(British Museum, Natural History.)

THE oriental butterfly, *Elymnias hypermnestra* (Linnaeus, 1758), is of particular interest in that, in certain parts of its range, the females are orange-red, when they bear a close resemblance to *Danaus plexippus* (Linnaeus, 1758) and *D. melanippus* (Cramer, 1777) when in flight. These orange-red females occur from Ceylon to Sikkim and Burma, and across Siam to south Annam and to Kedawi (in north Malaya), and in Java. In Formosa, south China, Hainan, Tonkin and central Annam, and then in Malaya proper, Sumatra and Borneo, in the Philippines, and then across the Lesser Sunda Islands to Timor, the females have the upperside blackish-brown, with a blue submarginal fascia on the fore-wing, and differ from the males chiefly in the lighter ground-colour. There are no records of this common species occurring in any of the islands off the west coast of Sumatra. I know of no other species of Rhopalocera showing such a distribution of two distinct female forms although, perhaps, it should be pointed out that some species of *Arhopala* Boisduval (LYCAENIDAE) present a somewhat parallel case in that the races from Burma and Java are very similar and have the upperside bright shining blue, while the intervening races from Malaya, Sumatra and Borneo have a dull purple upper surface.

It has been pointed out elsewhere (Corbet, 1941, *Proc. R. ent. Soc. Lond.* (A) 16: 101) that the north-west corner of British Malaya (Kedawi) pertains to a faunistic area which is different from that of Malaya proper and that, in a number of Malayan species of Rhopalocera, the Kedawi race is distinct from that of Malaya proper. The race of *E. hypermnestra* with orange-red female found in Kedawi may be referred to the Burmese subspecies *tinctoria* Moore, 1879, in which the upperside of the hind-wing is orange-red or white. In Malaya proper, on the mainland south of Penang, the subspecies is *beatrice* Fruhstorfer, 1902. This butterfly is rather variable and, in addition to the typical ♀-form *beatrice*, Fruhstorfer recognised two further female forms in Malaya: ♀-form *ornamenta* Fruhstorfer, 1907, in which the hind-wing has a series of 3 to 5 white submarginal spots, and ♀-form *agina* Fruhstorfer, 1902, in which the fore-wing submarginal band is whitish and not blue as in typical *beatrice*. This last-named form is the usual type in Singapore and Johore and *agina* should be regarded as the subspecific name for *E. hypermnestra* from this area. In Tioman Island, off the east coast of the Malay Peninsula, the subspecies *nimota* Corbet, 1937, is larger and the female has the fore-wing submarginal fascia whitish as in *agina*.

There is a paucity of reliable data regarding the position when two well-defined geographical races of a Rhopalocerous species meet. From the available evidence, however, it appears that such races differ by a large number of genetical factors, so that any interbreeding results in the production of a large number of intermediate forms. In this connection, see Waterhouse, 1922, *Proc. linn. Soc. N.S.W.* 47: ix-xvii and 1923, *Proc. linn. Soc. N.S.W.* 48: xiii-xvi, where it is shown that the highly variable race *joanna* (Butler, 1866) is a

natural hybrid between the neighbouring races *abeona* (Donovan, 1805) and *morisi* Waterhouse, 1914, of the Satyrid species *Tisiphone abeona*.

Elymnias hypermnestra is a fairly common species in secondary growth associations on the plains in Malaya proper, the larva feeding on *Cocos nucifera* among other plants. I have seen hundreds of this butterfly in Malaya proper and I am sure that it prefers the shade and is not often taken in flight in the open. In north Kedah and the Langkawi Islands, however, where the female is orange-red, the butterfly inclines to be more of an open country insect and is often taken in flight during the day-time, the orange-red female thus behaving in the same way as the *Danaus* species it resembles. In fact, as reported elsewhere (Corbet, 1937, *Proc. R. ent. Soc. Lond.* (B) 6 : 98), the first females of *E. hypermnestra tinctoria* Mre. taken by me in north Kedah were captured under the impression that they were a *Danaus* species.

The coconut palm is cultivated extensively in Penang, Province Wellesley and Kedah in north-west Malaya, so that it is probable that the distribution of *E. hypermnestra* is practically continuous between Johore in the south and Kedah and Perlis in the extreme north-west of British Malaya. It is of considerable interest, therefore, to find that, between the areas occupied by the races *tinctoria* Mre. and *beatrice* Fruh., is a region in which the females are extremely variable and grade from almost typical *tinctoria* to the usual *beatrice* form. The female of *discrepans* Distant, 1882, which was described from Penang and Province Wellesley, and is figured in Distant, *Rhop. Malay.*, pl. vi, fig. 3, is such an intermediate specimen, although nearer to the Kedawi form than to *beatrice* from Malaya proper.

In the British Museum is a series of 5 males and 9 females from Penang. The males, of course, are hardly distinguishable from the same sex from Kedawi or Malaya proper, but the females intergrade from typical *beatrice* to a form approaching *tinctoria*, although all these females have the upperside of the hind-wing brown as in *beatrice*. The females may be grouped as under :—

No. 1 resembles Distant's figure of *discrepans* female, but the pale orange area on the upperside of the fore-wing is more extensive and includes most of the cell, and the medial area on the hind-wing is noticeably suffused with orange-brown.

No. 2 has the orange area of the fore-wing deeper in colour and more reddish-brown, but more restricted, than in Distant's figure of *discrepans* : the medial area on the hind-wing is only slightly suffused with orange-brown.

In No. 3, the orange area on the fore-wing comprises a diffuse, circular spot in the medial area and it is deeper brown and smaller in size than in No. 2. On the hind-wing, the medial orange area is darker than in No. 2, but it is more clearly defined and there is a series of white submarginal spots.

No. 4 has the baso-dorsal half of the fore-wing deep reddish-brown. The hind-wing is without an orange area and has a series of rather faint, white, submarginal spots.

The remainder (Nos. 5–9) show gradations from those with a small but distinct reddish-brown area on the fore-wing to those without such colouring. Usually, the hind-wing has a distinct series of white submarginal spots, and in all but one example, the marginal third of the wing is paler and of an ochreous buff hue, although tinged with reddish-brown where it meets the rest of the wing.

Whether the intermediate forms occurring in Province Wellesley and Penang should be regarded as a subspecies distinct from the neighbouring races *tinctoria* Mre. and *beatrice* Fruh. may be an open question. Personally, I consider it

preferable to follow the procedure adopted by Waterhouse when dealing with *Tisiphone abeona* (Don.) and to regard these intermediates which occur in a clearly defined area as pertaining to the subspecies *discrepans* Dist.

The Malayan races of *E. hypermnestra* can now be listed as under :—

E. hypermnestra tinctoria Moore, 1879 : Langkawi Islands, Kedah and Perlis.

E. hypermnestra discrepans Distant, 1882 : Province Wellesley and Penang.

E. hypermnestra beatrice Fruhstorfer, 1902 : Malaya proper, south of Penang and north of Johore.

E. hypermnestra agina Fruhstorfer, 1901 : Johore and Singapore.

E. hypermnestra nimota Corbet, 1937 : Tioman Island.

A NEW SPECIES OF *DASYHELEA* (DIPTERA) FROM THE BAHAMA ISLANDS

By J. W. S. MACFIE, M.A., D.Sc., M.B., Ch.B., F.R.E.S.

Dasyhelea maculata sp. n.

A DARK brown species with the legs almost uniformly pale brown, and the scutellum yellowish-brown. Allied to the Chilean species *D. albopicta*, but differing as indicated below.

Male and female. Length of wing about 1.3–1.5 mm., greatest breadth about 0.4–0.5 mm.

Head very dark brown. Eyes apparently bare. Palpi pale brown, but last segment darker than others : segments sub-cylindrical, third not inflated, without pit, lengths of last four segments in one specimen 8, 14, 16, and 17 units respectively. Antennae brown, in female segments 3–7 paler than others; finely sculptured. In male plume not very dark : segments 4–11 successively narrower, measuring in one specimen from 12 by 13 to 13 by 10 units; 12–14 elongated, binodose, their lengths about 30, 28, and 24 units respectively; 15 rather longer, about 35 units, tapering at end, with stylet rather long, about 5 units, and not nipple-like. In female, segments 4–10 ranging in one specimen from about 9 by 9 to 10 by 7–8 units, bearing slender, curved, spines about as long as segments; 11–14 more elongate, sub-equal, about 14 by 7 units; 15 slightly longer, about 20 units, the last 3 units being the length of the straight stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 79, 68, and 78 units respectively.

Thorax rather dark brown, with traces of usual stripes on mesonotum, and with shoulder areas and sides paler, yellowish-brown, and some of the hairs in these areas infuscated at bases, thus producing a spotted appearance. Scutellum yellowish-brown, but darker in middle and at sides; bearing in both sexes 2 lateral, and 4–5 centro-marginal bristles, but no small hairs.

Wings unadorned, but in females with dark patch in middle of anterior border due to infuscation of veins which enclose second radial cell. Macrotrichia not very dense, but covering greater part of surface excepting radial areas; in anal cell numerous in female, almost wanting in male. Bare areas along veins distinct and rather wide. Costa extending slightly beyond middle of wing in both sexes. First radial cell obliterated, second longer

than broad. Fork of Cu well proximal to end of costa in both sexes. Halteres with whitish knobs which, however, bear an infuscated patch.

Legs almost uniformly pale brown, but femora with small darkish patch near middle, and all joints and 5th tarsal segments darkened. Form of segments and claws normal. T.R. about 1.6 in both sexes.

Abdomen with tergites dark brown, with small pale spots at points of insertion of hairs, narrowly paler posteriorly especially in males, and with paler median antero-posterior stripe. Sides pale brown, flecked with dark brown spots and streaks. Ventral surface mainly pale, but on segments 4-8 with dark brown area on each side of middle line. Spermathecae 2, moderately well chitinised, sparsely pitted, oval and rather variable in size, sub-equal, in one specimen measuring about 65μ by 48μ , tapering to duct, which otherwise is not chitinised at its commencement. Hypopygium (fig. 1) somewhat similar

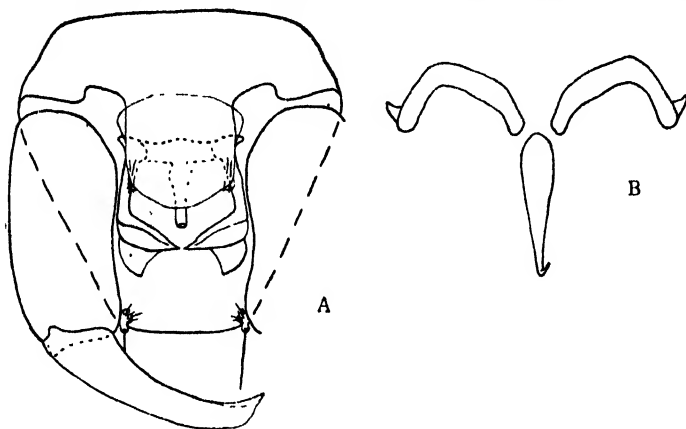


FIG. 1.—*Dasyhelea maculata* sp. n.: ventral views of hypopygium of male—(A) ninth segment and aedeagus; (B) hyparpes.

to that of *D. albopicta*. Ninth sternite without bristles, produced in middle line posteriorly as large oval plate. Ninth tergite pale posteriorly, with quite small processes at lateral angles. Side-pieces and claspers very dark brown. Harpes as in *D. albopicta*, two narrow, curved, transverse bands with a median process projecting posteriorly and ending in a sharp tip which is bent ventrally. Chitinised portions of aedeagus complex, appearing in ventral view as shown in figure.

BAHAMA ISLANDS: L. Cunningham, New Providence, May 1941, 4 ♂, 11 ♀ (Mr. A. Dean Peggs). The specimens had been preserved in spirit and so may have appeared a paler colour than they were during life.

This is a smaller insect than *D. albopicta*, length of wing 1.3-1.5 mm. instead of 2.0-2.1 mm., and the femora and tibiae are pale brown, not dark brown. The hypopygium, too, shows several points of distinction, notably in the form of the aedeagus.

The types of this new species are in the collection of the British Museum (Natural History).

A NEW SPECIES OF *MICROVELIA* (HEMIPTERA, VELIIDAE) FROM TRINIDAD

By W. E. CHINA, M.A., F.R.E.S.

THE VELIIDAE collected by Dr. Noel Hynes in Trinidad in 1941-1942 and submitted to me for identification are represented by *Rhagovelia elegans* Uhler, *Rhagovelia tenuipes* Champion, *Rhagovelia* sp. near *femoralis* Champion (not *R. abrupta* Gould nor *R. panda* Drake and Harris which are closely allied), *Rhagovelia calopa* Drake and Harris, *Microvelia robusta* Uhler, *Microvelia mimula* B. White, *Microvelia longipes* Uhler, *Microvelia distanti* Lundblad (= *insignis* Distant 1912 nec 1903), *Microvelia stellata* Kirkaldy and a new species of *Microvelia* which I herewith propose to describe. In addition Dr. Hynes collected *Rhagovelia plumbea* Uhler and *Velia brachialis* Stål on the neighbouring island of Tobago.

Microvelia trinitatis sp. n. (figs. 1 and 2).

Colour, winged ♂ and ♀. Head dull black with a short grey pubescence, longer and more visible at sides along inner margins of eyes, a narrow median percurrent longitudinal furrow and the clypeus shining black: a small jet-black spot in each posterior lateral angle of vertex; bucculae sordid yellowish-grey; eyes dark brown; rostrum sordid yellowish-brown, the apical segment shining black; antenna dark brown, the base of first segment sordid yellowish-grey. Pronotum dull fuscous brown, the anterior region in front of humeral angles and including collar uniformly fulvous, the fulvous area extending posteriorly on each side of the median ridge, which remains fuscous, nearly to the anterior margin of the pronotum; pronotal punctures dark brown. Pro-, meso- and metapleura and acetabula dull fulvous yellow, the sterna dull brownish-black, the dark colour of the mesosternum extending a little on to the mesopleura between the middle and hind acetabula. Hemelytron dark fuscous brown, shading to dark grey along the inner (anal) margin, veins indistinct and unicolorous; a whitish stripe at base of corium, widening from base to its obliquely truncate apex and extending a little below the apex of the pronotum, cells with three large greyish spots arranged as in fig. 1, the anterior spot tending to be divided into two by a fuscous stripe. Coxae, trochanters and femora pale whitish-yellow, the apex of front femur, the apical third of middle femur and apical half of hind femur dark fuscous to black; all tibiae and tarsi dark fuscous shading to black at apices of tarsi. Dorsum of abdomen including connexivum yellowish-brown; venter dull black with the sides broadly fulvous, this fulvous band broadening on to the seventh sternite, a row of small jet-black spots down inner margin of each lateral fulvous band, approximately two to each segment; genital segment fulvous.

Brachypterous ♂. Similar in coloration to macropterous ♂ and ♀, but abbreviated wings uniformly fuscous without white or grey markings.

Structure, winged ♂. Head triangular, strongly convex, slightly longer in middle than wide at base between the eyes (20:18), width including eyes one and a half times length (30:20), distinctly wider than anterior margin of pronotum; each eye about one-third as wide as head at base between the eyes (6:18); a narrow glabrous percurrent furrow down middle of head, three small setigerous sensory pustules on each side of head, one in basal lateral angle jet black, the other pair reddish-brown, placed relatively close

together along upper half of inner margin of eye; sides of head inside eyes with a short silvery pubescence; clypeus with several longer dark hairs; rostrum extending to apices of front coxae, relative lengths of segments 4:9:16:7; antennae as long as head and pronotum together, relative lengths of segments 12:11:15:19, the first segment distinctly thickened, the second slightly thickened, the third slender and linear, the fourth fusiform, about as thick in middle as second; covered with short pubescence longer on fourth segment, especially at apex.

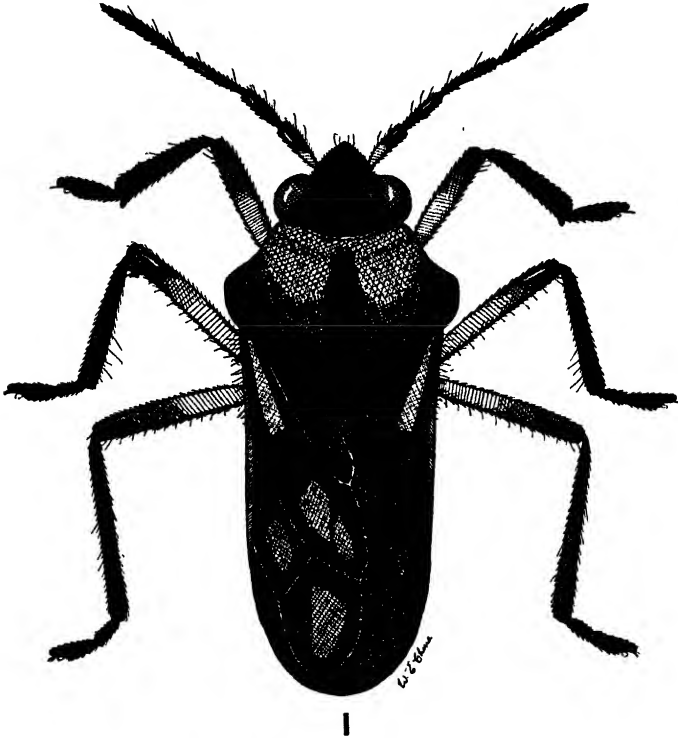


FIG. 1.—*Microvelia trinitatis* sp. n. macropterous male.

Pronotum with narrow annular collar, humeral angles prominent, apex broadly rounded, the posterior lateral margins forming rather less than a right angle; distinctly wider across humeral angles than long in the middle (52:40) and slightly wider anteriorly than half width across humeral angles (27:52); a rather flat broad ridge down the middle and some obscure punctures on anterior half of disc and a number of larger and deeper ones regularly spaced on posterior half (difficult to see with low magnification); covered with a very short bristly golden pubescence rather longer on apical half; mesosternum broadly furrowed in middle, the furrow occupying whole width at posterior margin and narrowing strongly anteriorly, a distinct concave impression below each of anterior coxae, the ridges on each side of median furrow and the posterior margin covered with short depressed golden pubescence; metasternum also with similar but rather longer pubescence on posterior half. Hemelytra extending to apex of abdomen, but exposing edges of vertical connexivum on each side; corium with moderately long semi-erect golden pubescence especially along veins which are moderately distinct and longer along base of costal margin; membrane glabrous with the veins indistinct. Intermediate and hind femora with a row of well-

spaced very fine bristles along posterior margin, about half as long as width of femora; tibiae, especially anterior and posterior pairs, with a few bristles along anterior margin,

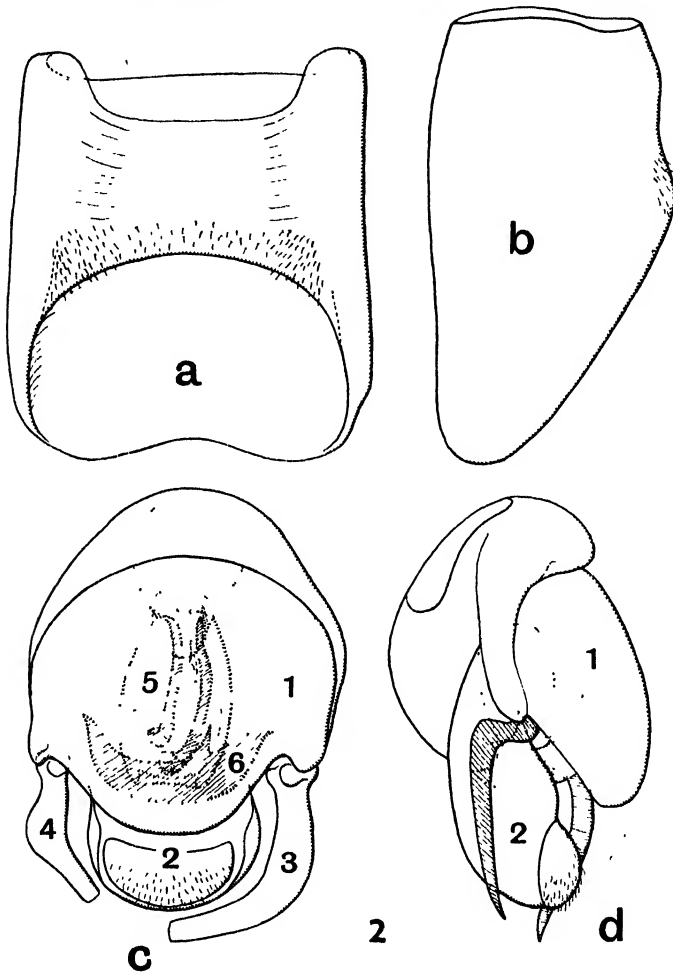


FIG. 2.—*Microvelia trinitatis* sp. n. male genitalia. a. ventral view of eighth segment. b. right-hand lateral view of same. c. ventral view of ninth and tenth segments with aedeagus *in situ* shown by dotted line. d. right-hand lateral view of same. 1. ninth sternite; 2. tenth segment with anal lid; 3. left-hand paramere; 4. right-hand paramere; 5. penis (phallosoma) containing swell-body (endosoma) with its two chitinous rods; 6. penis lever (theca) on which penis hinges.

the intermediate tibiae with a few long bristles along apical half of posterior margin; anterior tibiae ending in a short spur on ventral side. Relative lengths of legs:—

	Coxa	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front leg . .	6	9	28	23	—	13
Middle leg . .	8	12	34	30	6	11
Hind leg . .	10	11	35	40	8	12

Venter distinctly and broadly concave along median line, the eighth ventrite distinctly longer than the seventh (10:8) and strongly concave in middle, sides of venter covered with sub-erect moderately long pale pubescence, longer towards apex of venter; no tubercles or tufts of hair on venter.

Male genitalia (fig. 2):—The two parameres (copulation hooks) without hairs, similar in shape, laminate, curved, broadest in middle, narrowing to truncate apex, the left-hand paramere nearly twice as large as right-hand paramere and more strongly curved; pygophor (ninth segment produced posteriorly between parameres in a broad rounded lobe), at the base with a deep constriction parallel (ventral view) with the basal margin of ventral side; anal segment large, lobate; aedeagus short, tubular, narrowest at apex and widest just above base containing the swell body (Ekblom¹) with two chitinous sinuous rods within; lever of penis (theca of Peytoureau) at posterior end of penis strongly chitinised, broadly arched and broadly curved, much wider than the penis. Basal plates obsolete or not readily visible.²

Total length:—1.79 mm.; width across humeral angles 0.75 mm.

Macropterous ♀. Similar to male but middle tibiae without the long bristles along apical half of posterior margin. Seventh ventrite much longer than sixth (18:10), not strongly concave in middle.

Total length:—1.87 mm.; width across humeral angles 0.79 mm.

Brachypterous ♂. Distinctly smaller and much narrower than macropterous male, with the pronotum less convex, the humeral angles less prominent. Hemelytra extending only slightly beyond apical margin of fifth tergite. Pronotum about four-fifths as long in middle as wide across humeral angles (38:50) and distinctly more than half as wide anteriorly as long in middle (27:38).

Total length:—1.77 mm.; width across humeral angles, 0.71 mm.

Habitat:—BRITISH WEST INDIES, Trinidad, El Tucuche. On upland forest rock pools; 11 ♂♂ (including type) and 9 ♀♀, seepage pool, 2400 ft., 10.i.1942 (*N. Hynes*); collection no. 146 (2); 3 ♂♂ (including brachypterous form), 3 ♀♀ and 4 nymphs, seepage pool, 2700 ft., 10.i.1942 (*N. Hynes*), collection no. 143 (3). *Microvelia* sp. "D" in Hynes List.

This seems to be a very distinct species, judging by the rather inadequate descriptions of the numerous other American species of *Microvelia*. The striking coloration of the pronotum and the relative lengths of antennal segments are characteristic. The apterous form is unknown.

¹ See Ekblom's description of the male genitalia of *Velia currens*. *Zool. Bidrag Uppsala* 10: 139-143, figs. 207-216, 1926.

² It is not clear whether the penis lever represents the fused basal plates or not. In the primitive *Idiocoris* (Esaki and China, 1927, *Trans. ent. Soc. Lond.* 75, part 2: 289, fig. 8) both basal plates and penis lever (AP.AE) are present.

BOOK NOTICE.

Biological control of insects. By Hugh NICOL. 8vo: Harmondsworth, Mdx. (Penguin Books Ltd.), 1943. pp. 1-174, 8 pls., 10 figs. Price 9d.

This book contains a popular discussion of biological control of insects, and is published at a price which makes it available to any reader interested in the subject. The author uses a style which can be understood by anyone. A short list of books suitable for further reading is given, and there is a "quiz" of 16 questions, with the answers on a later page.

BOOK NOTICES.

John Ray Naturalist. His life and works. By Charles E. RAVEN. 8vo. Cambridge, 1942 (Cambridge University Press). pp. xix + 502, frontisp. Price £1 10s.

In the preface the author says that his concern in this book "is not with the general record of man's discovery of the scientific method or of his application of it to the service of his needs and ambitions, so much as with one consequence of those events." As a theologian, his task long ago convinced him of "the importance of the change in man's aesthetic, moral and religious outlook which had accompanied and in large measure inspired the scientific movement." As a result of his investigations he formed the opinion that to John Ray was due, more than to any other biologist, that change which arose from the old world of superstition based on deduction from the Bible and the works of Aristotle, to a basis of knowledge founded on true observation of nature.

The book is arranged in seventeen chapters with the following titles :—

- I. Boyhood and Youth.
- II. At Cambridge University.
- III. First studies in science.
- IV. The *Cambridge Catalogue*.
- V. The Years of Travel.
- VI. The *English Catalogue*.
- VII. The Years of Varied Output.
- VIII. The structure and classification of plants.
- IX. The *History of Plants*.
- X. The Flora of Britain.
- XI. Last work in Botany.
- XII. The *Ornithology*.
- XIII. The *History of Fishes*.
- XIV. Of mammals and reptiles.
- XV. The *History of Insects*.
- XVI. Of fossils and geology.
- XVII. The *Wisdom of God*.

A portrait of Ray forms a frontispiece to the work, and a *General Index*, *Index of Flora*, and *Index of Fauna* complete the volume. The book is very attractively printed on good paper. The appearance of such a work at the present time must be welcome to all lovers of a good book.

Studies of North American Plecoptera, with special reference to the fauna of Illinois. By T. H. FRISON. *Bull. Ill. nat. Hist. Surv.* 22 : 231+355, 126 figs. Urbana, Illinois, 1942.

This paper is the result of a continuation of studies on the stonefly fauna of Illinois started in 1926, which have recently been extended to include the whole North American fauna. A revised list of the Plecoptera of the State of Illinois is given, and the majority of the species are illustrated in some detail, particular attention being paid to male and female genitalia.

A number of new species discovered during the study are described, and a revised classification is proposed on the basis of the results obtained.

BOOK NOTICES.

Studies in the genetics of Drosophila. II. Gene variation and evolution. Directed by J. T. Patterson. 8vo. Austin, Texas, U.S.A. (University of Texas Publication No. 4228). 1942. pp. 1+200. Price \$1.00.

This part of the University of Texas Publications comprises ten papers dealing with variation in *Drosophila* of various groups. The papers included are entitled :

- I. Interspecific hybridization in the Genus *Drosophila*. By J. T. Patterson.
- II. Heterosis in *Drosophila Hydei*. By Wilson S. Stone.
- III. Analysis of the repleta group of *Drosophila*. By Linda T. Wharton.
- IV. Cross fertility and isolating mechanisms in the *Drosophila mulleri* group. By J. F. Crow.
- V. Relationships in the *Melanica* species group. By A. B. Griffen.
- VI. Genetic relationships in the *Drosophila funebris* Group. By G. B. Mainland.
- VII. A study of intersexes produced by a dominant mutation in *Drosophila virilis*, Blanco Stock. By W. W. Newby.
- VIII. The Ix^o factor and sex determination. By Wilson S. Stone.
- IX. Distribution of the *virilis* group in the United States. By J. T. Patterson.
- X. Genetic and cytological analysis of the *virilis* species group. By J. T. Patterson, Wilson S. Stone, and A. B. Griffen.

Atlas of the Scale Insects of North America. By G. F. FERRIS. Fourth Series. Nos. 385-444 (60 pls.). 1942. 4to. Stanford, Calif. (Stanford University Press, Stanford University), and Oxford University Press. Price, bound £2 2s.; unbound £1 15s.

This fourth volume follows exactly the pattern of Volumes 1-3, already noticed in the *Proceedings*, but an innovation has been made in issuing the work in two forms. It may be purchased unbound for £1 15s. per volume, or £1 10s. if all four volumes are taken, and the bound edition of the volume costs £2 2s.

One new genus, twenty-one new species, and two new generic names are proposed in the volume, and a general index to the four series is provided. In the epilogue to the work the author states that it is probable the *Atlas* will be discontinued with the publication of this fourth volume. Whereas in happier times it was found possible to continue it with little financial loss, the present condition of the world has removed that possibility, and the loss now experienced has become excessive. Should the publication of the work be resumed after the war, the author has decided that he will not continue with the loose-leaf form.

The material available in the family DIASPIDIDAE has now all been studied, and the 345 species which the author considers should be assigned to the family have all been dealt with. Five known species are not available, and have not been dealt with in the work. In the author's opinion the 345 species so far described probably represent not more than one-third of the species of the family which exist in North America.

DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA) ¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

32 *Mitomorphus brevipennis* sp. n.

Shining, head and thorax darker or lighter reddish-brown; elytra pitchy-black; the scutellum and base narrowly reddish-yellow; abdomen pitchy-black, the elevated lateral margins and posterior margins of the 7th and 8th tergites yellowish. Antennae reddish. Legs yellow. Length 6.5 mm.

In colour very like *indicus* Kr. but larger and more robust and the elytra without metallic reflex, the head more narrowed towards the front and so more ovate, the eyes much smaller. Head longer than broad (4 : 3.5), ovate, broader than the thorax, the eyes very small, in front with four very small quadrately placed punctures. behind the middle with transverse row of four moderate punctures, the sides and base with a few very small scattered punctures; ground sculpture absent. Antennae with the 3rd segment shorter than the 2nd, 4th to 10th transverse, the penultimate three times broader than long. Thorax longer than broad (5 : 3), the sides straight and a little retracted behind, with a row of six small punctures on each side of the middle, at the side with seven others in a hook-shaped line. Elytra a little shorter than the thorax (4 : 5), slightly widened behind, along the suture with five or six extremely fine and obsolete punctures, on the disc with five or six larger irregular punctures. Abdomen very finely and sparingly punctured and with a fine, transverse wavy ground sculpture.

DARJEELING : Ghum district : Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

33 *Mitomorphus brachypterus* sp. n.

Of the colour of *brevipennis* Cam. and only differs from it in the smaller size (5 mm.) and narrower build, the thorax with nine or ten moderate punctures in the dorsal row and with more numerous ones at the sides. The elytra are shorter than the thorax (2.5 : 3), the antennae less stout.

DARJEELING : Ghum district. Type in my collection.

34 *Xantholinus* (s.str.) *aeneus* sp. n.

Smaller (5–7 mm.) and narrower than *metallicus* Fauv. with stronger greenish-coppery reflex, the head much less widened behind, much less coarsely and a little less closely punctured, thorax narrower with dorsal row of ten large punctures and lateral curved row of about seven much as in that species, elytra as closely but not quite so coarsely punctured as in *metallicus* but in other respects similar.

DARJEELING : Ghum district. Type in my collection.

35 *Othius kashmirica* sp. n.

Shining, head and abdomen pitchy-black, thorax reddish, elytra pitchy-brown with the shoulders and posterior margin narrowly reddish-yellow. Antennae yellowish-red. Legs reddish-yellow. Length 6.5 mm.

Near *lapidicola* Kiesw. but differently coloured, the head broader, as long as broad, as broad as the thorax, the eyes smaller, elytra a little shorter, shorter than the thorax

¹ Continued from 1943, *Proc. R. ent. Soc. Lond.* (B) 12 : 30.

(3:3.75), the sculpture scarcely differing. Abdomen distinctly more closely punctured, the 7th tergite without membranous margin.

KASHMIR : Gulmarg. Type in my collection.

36 *Othius monticola* sp. n.

Shining, black, the elytra pitchy-black with the reflexed and posterior margins narrowly and obscurely yellowish. Antennae brown, the first three segments red. Legs reddish-yellow. Length 11–12 mm.

In size and build scarcely differing from *punctulatus* Goze, but differently coloured, the antenna a little longer, the 4th and 5th segments longer, the penultimate scarcely transverse, the post-ocular punctures larger, elytra about as closely but distinctly more coarsely punctured and without ground sculpture, the puncturation of the abdomen not so fine and not so close.

DARJEELING : Ghum district : Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

37 *Actobius monticola* sp. n.

Moderately shining, black. Antennae blackish, the first two and last two segments reddish-yellow, sometimes entirely reddish-yellow. Legs reddish-yellow, the intermediate and posterior tibiae blackish. Length 6 mm.

Larger and more robust than *cinerascens* Gr., the antennae longer, the penultimate segments distinctly longer, eyes larger, head less closely punctured, thorax more superficially punctured with much less distinct ground sculpture : from *affinis* Cam. differs in the larger size, longer antennae, much less closely, more superficially punctured head, less shining, more finely and superficially punctured thorax with distinct ground sculpture. Head as long as broad, quadrate, as broad as the thorax, the post-ocular region very slightly retracted to the rounded posterior angles, eyes rather large but a good deal shorter than the post-ocular region, finely moderately closely punctured, finely but distinctly coriaceous. Antennae with all the segments longer than broad, the penultimate only slightly. Thorax nearly a third longer than broad, narrowly impunctate along the middle, elsewhere with larger and closer punctures than on the head, the ground sculpture less distinct. Elytra longer (4.5 : 3.5) than the thorax, very finely and very closely punctured. Abdomen narrowed towards the apex, finely and closely punctured and pubescent throughout.

♂. 6th sternite with a shallow arcuate emargination, the area in front of it practically impunctate in the whole length of the segment.

DARJEELING : Ghum district : Mangpu. Type in my collection.

38 *Actobius mangpuensis* sp. n.

Shining, black. Antennae blackish, the last two segments reddish-yellow. Femora and tarsi reddish-yellow. Tibiae black. Length 4.5 mm.

Size and build of *basalis* Motsch. but entirely black, with darker antennae and legs ; head, thorax and elytra with similar sculpture but the former slightly broader, the abdomen obviously less finely and less closely punctured and pubescent. The structure of the antennae similar.

DARJEELING : Ghum district : Mangpu. Unique. My collection.

39 *Actobius major* sp. n.

Moderately shining, black. Antennae blackish, the first two and the last two or three

segments reddish-yellow, sometimes the first two pitchy. Legs pitchy, the tarsi lighter. Length 7-8 mm.

Colour and lustre of *monticola* Cam. but larger and more robust, the legs darker, the antennae longer, the head differently shaped. Head very slightly longer than broad, short, oval, as broad as the thorax, as finely but distinctly less closely punctured than in *monticola*, finely but distinctly coriaceous as in that species. Antennae long and slender, all the segments longer than in *monticola*. Thorax longer than broad (4 : 3.5), impunctate along the middle, elsewhere as on the head, less close than in *monticola* and the ground sculpture weaker. Elytra longer than the thorax (4.5 : 4), very finely and very closely punctured. Abdomen narrowed towards the apex, very finely and closely punctured and pubescent throughout.

♂. 6th sternite with a shallow arcuate emargination in the middle of the posterior margin.

DARJEELING : Ghum district : Mangpu. Type in my collection.

40 *Philonthus fletcheri* sp. n.

Shining, black, the elytra with slight greenish metallic reflex; thorax with dorsal row of four punctures. Antennae black. Legs pitchy, the tarsi lighter. Length 6.5 mm.

Resembling *punctifrons* Cam. in the build, but with much shorter antennae, the head not punctured in front, the punctures of the dorsal row smaller, the elytra and abdomen less closely punctured. ♂. Head quadrate, distinctly broader than the thorax, slightly broader than long, in the ♀ narrower, as long as broad, as broad as the thorax, in both sexes with the inter-ocular punctures equidistant, the front with feeble median impression; eyes small, a good deal shorter than the temples, with a few small punctures between the eye and the neck on each side, the post-ocular region with three or four fine punctures; ground sculpture very fine. Antennae with the 3rd segment longer than the 2nd, 4th and 5th about as long as broad, 6th to 10th transverse, varying but little amongst themselves and about a half broader than long. Thorax longer than broad (4 : 3.5), the sides straight and distinctly retracted to the base; punctures of the dorsal row rather small; ground sculpture as on the head. Elytra as long as but broader than the thorax, the puncturation much like that of *sordidus* Gr. Abdomen finely and rather sparingly punctured, the ground sculpture fine; the 1st segment of posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite rather deeply arcuately excised, the margin of the excision with narrow shining border.

KASHMIR : Gulmarg. Type in my collection.

41 *Philonthus montivagans* sp. n.

Very near *fletcheri*, of the same colour, lustre and build, but larger, 7-7.5 mm.; the head in the ♀ as long as broad, broader than the thorax, the median inter-ocular punctures widely separated, much nearer to the external than to each other, the elytra more finely and more closely punctured, the abdomen a little more closely; antennae not quite so stout, the penultimate segments less transverse, in other respects similar.

♂ unknown.

DARJEELING : Ghum district. Type in my collection.

42 *Philonthus medioeris* sp. n.

Shining, black; thorax with dorsal row of four punctures. Antennae black. Legs reddish-yellow, the tibiae infusate. Length 5-5.5 mm.

Near *kashmiricus* Cam. but smaller and narrower, the femora lighter, the elytra with-

out metallic reflex, less coarsely but more closely punctured, the abdomen more closely punctured. Head oblong, the posterior angles rounded, longer than broad (3:2.5), a little narrower than the thorax, the eyes small and flat, about a third as long as the post-ocular region, the median inter-ocular punctures widely separated, the front slightly impressed in the middle; between the eye and the neck with three or four small punctures and one or two smaller ones on the temporal region; ground sculpture very fine and wavy. Antennae as in *kashmiricus*, the penultimate segments distinctly transverse. Thorax longer than broad (3.5:3), the sides straight and very slightly retracted towards the front, with dorsal row of four moderate equidistant punctures, externally with three others, the ground sculpture as on the head. Elytra longer (4:3.5) than the thorax, the puncturation much as in *finetarius* Gr., that of the abdomen also much as in that species. First segment of the posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite with small, smooth, triangular impression at the middle of the posterior margin, its base feebly arcuately emarginate.

KASHMIR: Gulmarg. Type in my collection.

43 *Philonthus aeripennis* sp. n.

Black, shining, the head and thorax with distinct metallic green reflex, the elytra brassy; thorax with dorsal row of four punctures; abdomen pitchy-black, the posterior margins of the tergites narrowly but distinctly yellowish-red. Antennae black, the first two segments yellowish-brown. Legs reddish-yellow, the tibiae infusate. Length 5.5 mm.

Near *adversus* B. & S. but differs in the colour, much longer antennae and more closely punctured abdomen. ♂. Head very slightly longer than broad, quadrate, broader than the thorax, impressed in the middle in front, the median inter-ocular punctures widely separated from each other, much nearer the lateral, on each side of the disc with three or four punctures, and one or two others much smaller on the temples. ♀. Head narrower, longer than broad, as broad as the thorax. Antennae with the 4th and 5th segments a little longer than broad, 6th to 10th as long as broad and differing but little. Thorax longer than broad (3:2.5), the sides distinctly retracted towards the base, but less strongly than in *adversus*, with dorsal row of four rather large equidistant punctures. Elytra a third longer than the thorax, moderately finely, rather closely punctured. Abdomen very finely, rather closely punctured, more closely than in *adversus*. First segment of the posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite with feeble arcuate emargination at the middle of the posterior border filled in by membrane.

DARJEELING: Ghum district: Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

44 *Philonthus funeralis* sp. n.

Black, shining, abdomen somewhat iridescent. Thorax with dorsal row of five punctures. Antennae, palpi and legs (including the coxae) black. Length 13.5 mm.

Build of *foetidus* Cam. but larger, the antennae similarly constructed but stouter, puncturation of elytra as close but coarser, abdomen less finely, distinctly less closely punctured and more iridescent. Anterior tarsi dilated in both sexes, more strongly in the male. First segment of posterior tarsi longer than the last.

♂. 6th sternite with smooth acute triangular impression at the middle of the posterior margin, the posterior part of the impressed area membranous and white.

KASHMIR: Gulmarg, altitude 8000–10,000 feet. Type in my collection.

୪୫ ***Philonthus atricoxis* sp. n.**

Shining, deep black. Antennae, palpi and legs (including the coxae) black. Thorax with dorsal row of five punctures. Length 6.5–7.5 mm.

In size and build scarcely differing from *varians* Payk. but the antennae shorter and stouter, the penultimate segments about as long as broad, the coxae deep black, the elytra and abdomen not quite so closely punctured, the former blacker than in the black form of that species. From *nigricoris* Cam. it differs only in the rather less closely, less finely and less roughly punctured elytra.

♂. Anterior tarsi dilated. 6th sternite acutely triangularly impressed, the base of the impression rather deeply arcuately emarginate.

KASHMIR : Gulmarg, altitude 8000–10,000 feet. Type in my collection.

୪୮ ***Philonthus (Gabrius) sodalis* sp. n.**

Shining, black, the elytra pitchy-black: thorax with dorsal row of five punctures. Antennae and palpi black. Legs brownish-yellow, the tibiae pitchy. Length 4.5 mm.

Near *foveifrons* Cam. but with narrower, oval head, the ground sculpture much weaker, the eyes larger, the antennae entirely black and with more transverse penultimate segments, elytra a little longer, pitchy-black, the punctures finer and closer, abdomen more narrowed towards apex. Head short, oval, slightly narrower than the thorax, in the middle between the eyes with a small round fovea, median inter-ocular punctures widely separated, ground sculpture scarcely visible. Antennae with the 3rd segment as long as the 2nd, 4th slightly longer than broad, 5th as long as broad, 6th to 10th transverse, the penultimate about a half broader than long. Thorax a little longer than broad, the sides parallel, ground sculpture absent. Elytra scarcely longer than the thorax, moderately finely and moderately closely punctured. Abdomen finely and moderately closely punctured.

UNITED PROVINCES : Chakrata district: Sainj Khud, altitude 6500 feet. Unique. My collection.

୪୭ ***Philonthus (Gabrius) rupicola* sp. n.**

Black, shining, the elytra dark blue, less shining: thorax with dorsal row of six punctures. Antennae and legs black, the tarsi reddish-yellow more or less spotted with black. Length 6 mm.

Near *humidulus* Cam., and like it has the abdomen adjacent to the side margin more thickly pubescent than elsewhere, but the head is a little shorter and broader, the elytra blue and much more finely and closely punctured as is the abdomen also. Head subovate, longer than broad (3:2.5), as broad as the thorax, the eyes small, the front sometimes with a small impression, the median inter-ocular punctures widely separated, the ground sculpture fine and wavy. Antennae with the 4th and 5th segments slightly longer than broad, 6th and 7th about as long as broad, 8th to 10th very slightly transverse. Thorax longer than broad (3.3:2.5), the sides straight and retracted towards the base, with dorsal row of six moderate punctures and three others externally: ground sculpture as on the head. Elytra as long as but broader than the thorax, very finely and closely punctured. Abdomen very finely and closely punctured and pubescent, the pubescence closer and more evident at the sides. First segment of posterior tarsi scarcely shorter than the last.

♂. Anterior tarsi simple. 6th sternite with a narrow, smooth digital impression at the middle of the posterior margin.

This species together with *humidulus* belong to the *astutus* Er. group.

DARJEELING : Ghum district. In stream, in moss on boulders.

♂ ***Philonthus (Gabrius) ignobilis* sp. n.**

Black, shining; thorax with dorsal row of six moderate punctures. Antennae black, the 1st segment and base of the 2nd reddish. Legs reddish-yellow, the tibiae infusate. Length 5.5 mm.

Very near *vicinus* Cam. but with the elytra shorter, blacker and not quite so finely punctured; head a little shorter. Antennae longer, the penultimate segments scarcely transverse. Head quadrate, as long as broad, as broad as the thorax, the eyes small, about $\frac{1}{3}$ rd the length of the temple, median inter-ocular punctures widely separated, the front with slight impression; behind the median inter-ocular punctures with another pair and a row of six others extending from the inner border of the eye towards the neck, the post-ocular region with a few smaller ones. Antennae slender, the 4th to 6th segments slightly longer than broad, decreasing in length, 7th about as long as broad, 8th to 10th scarcely transverse. Thorax longer than broad (3 : 2.5), the sides straight and very slightly retracted towards the front, with dorsal row of six moderate punctures and two others externally. Elytra as long as but broader than the thorax, finely, moderately closely punctured. Abdomen very finely, rather closely punctured throughout; ground sculpture scarcely visible. Head and thorax with very fine wavy ground sculpture. Anterior tarsi simple. First segment of posterior tarsi shorter than the last.

♂. 6th sternite with smooth acute triangular impression at the middle of the posterior margin.

KASHMIR : Gulmarg, altitude 8000–10,000 feet. Type in my collection.

♂ ***Philonthus (Gabrius) deceptivus* sp. n.**

Size, build and colour of *parkeri* Cam., but differs in the much more finely and more sparingly punctured elytra and the less closely punctured abdomen with shorter pubescence. Length 5.5 mm.

♂. Anterior tarsi simple. 6th sternite along the middle with a narrow parallel impunctate impression, its posterior margin very feebly arcuately emarginate.

KASHMIR : Gulmarg. Type in my collection.

BOOK NOTICE.

The Golden Throng. A book about bees. By E. W. TEALE. 8vo. London (R. Hale, Ltd.) 1942. pp. 160, 65 pls. Price 21s. 0d.

In his Foreword the author writes : " The story of the bees has been told by poets like Maeterlinck, by scientists like Huber and Lubbock, by practical beekeepers like Phillips and Root. . . . In adding this volume to the long list of bee books, I have sought—in addition to recording discoveries of recent years—to bring to the reader, through the eye of the camera, the age-old drama of life in the hive and in the bee's world of flower-filled fields."

The text is written in plain language which can be understood by any average person, but the chief feature of the book is the illustrations. These are very beautiful and well reproduced, for, while some indication of wartime paper is to be noticed in the text, there is no sign in the paper used for the plates.

A chapter entitled " Photographic Postscript " gives some practical hints to the would-be photographer of bees.

There is a " Bibliography " at the end of the volume which undoubtedly suffers from the author's omission to provide the dates of the works he lists.

ON THE GENERA AND NOMENCLATURE OF THE LUCANID COLEOPTERA, AND DESCRIPTIONS OF A FEW NEW SPECIES

By Gilbert J. ARROW, F.Z.S., F.R.E.S.

British Museum (Natural History).

EIGHT years ago, in "A Contribution to the Classification of the family LUCANIDAE" (1935, *Trans. R. ent. Soc. Lond.* **83** : 105), I put forward the principle that, except in certain peculiar circumstances, genera should not be based upon characters confined to one sex and proposed, as a consequence, the abandonment of various generic names in use in the LUCANIDAE. The principle received general assent when submitted to a meeting of the Royal Entomological Society and during the years that have since elapsed it has not, so far as I am aware, been adversely criticised anywhere. The desirability of the simplified nomenclature resulting from its acceptance may therefore be regarded as admitted.

In the family LUCANIDAE the extreme polymorphism of the males has been the cause of a great multiplication of names, but this family is not one of the very large groups of beetles and a considerable reduction in the number of genera will leave the largest genus far inferior to many genera of other families. In the last catalogue of LUCANIDAE, published in 1910, 750 species were enumerated and the number has since been raised to over a thousand but this certainly includes many yet undiscovered synonyms. As further collecting continues to reveal the extent of polymorphism, the addition of new names to the list is likely for long to be accompanied by the removal of others. Since the most obvious distinctive features are found in the mandibles of the males, the variation of which is only exhibited by long series which, as I have recently shown, sometimes include isolated phases connected by no intermediates with the rest, far more collecting is required before any adequate revision of the catalogue will become possible.

If the form of the mandible of the male provides an unreliable basis for distinguishing species it is still more so for the establishment of genera, which, to be natural, must be based on fixed and well-established characters. A number of names treated as generic in the catalogues were intended by their authors only as subgeneric and by those who consider as useful subgenera of which the only distinctive features are not always present, they can still be so employed; but subgeneric names are open to the serious objections mentioned in my paper quoted above (see also 1935, *Proc. R. ent. Soc. Lond.* **83** : 34) and in the interest of clarity are better avoided. The invariable confusion which arises from the use of names indistinguishable from those of genera are avoidable by adherence to the Linnæan method of using terms with plural endings for all subdivisions except the genus; or sections of the genus may be designated by a letter or number, or by the name of a representative species.

Lamprima.

Dr. Didier (1931) has maintained as a distinct species, *Lamprima coerulea*, a blue form supposed to be that to which the name *coerulea* was given by Donovan in 1805 and regarded by Boileau (1913) as a "variety or subvariety" of *L. latreillei* Macl. Nagel (1933) has pronounced this to be closer to *L. aurata* Latr. than to *L. latreillei* on account of the blunter mesosternal process, which

seems to be the only means of distinguishing them. Unless Donovan's original specimen can be discovered it will probably remain impossible to determine to which of these forms it belongs. It is a little doubtful whether they are always distinguishable. Similar blue forms seem to occur in *L. aurata* Latr., *latreillei* MacI. and *adolphinae* Gestro, linked by every shade of green and golden-green to the red and purple phases. While the head is more constant in colour, it also varies but is generally red.

Lucanus.

As I pointed out in 1935, the separation of *Lucanus* and *Pseudolucanus* by the form of the mandibles in the male is untenable. Their union entails the re-naming of *L. oberthuri* Planet (Tibet), since the name was employed a year earlier for *L. (Pseudolucanus) oberthuri* Planet (Sikkim). The Tibetan species may be called *Lucanus laetus* nom. n.

Lucanus laevigatus Didier (1931), according to a co-type in the British Museum, is the glossy black female of the dull red *L. fortunei* Saund. Both sexes were taken together but, when received by the Museum, were not at first associated, owing to their remarkable dissimilarity.

Calcodes.

I have shown that *Calcodes*, *Odontolabis* and *Neolucanus* cannot properly be separated, the last consisting only of species in which the mandibles of the male have not advanced beyond the stage of development found in small specimens of the former. A few specific names which have been twice used must be changed.

Calcodes (Odontolabis) leuthneri was described by Boileau in 1897 and *C. (Neolucanus) leuthneri* in 1899 but the later name is a synonym of *C. parryi* Leuthner, described in 1885. The last name was used again by Boileau in 1905 for *C. (Odontolabis) parryi*, which, according to Kriesche (1922), does not differ specifically from *C. siva* Hope & Westwood. From its habitat, as well as the various slight structural differences, it seems to me more likely to prove distinct. The British Museum contains a female from Formosa and a small male from the adjacent mainland of Foochow. The male differs from that of *C. siva* in having the canthus distinctly angulate in front of the eye and the prosternum not pointed but forming a rounded boss behind the front coxae. The female has the prosternum pointed behind but not produced as it is in *C. siva*. For Boileau's name I propose to substitute *Calcodes chinensis* nom. n.

Calcodes (Odontolabis) celebensis was named by Leuthner in 1885 and *C. (Neolucanus) celebensis* by Möllenkamp in 1900. For the latter name may be substituted *Calcodes celebicus* nom. n.

Another duplication of names has occurred with *C. (Odontolabis) intermedius* Van de Poll and *C. (Neolucanus) intermedius* Houlb. (1914) but the latter is undoubtedly a variety of *C. opacus* Boil. and no serious difficulty arises.

The unique specimen named *Neolucanus sarrauti* by Houlbert (1912) and considered by him to be a female is shown by the shape of the head and mandibles and the slenderness of the legs in his figures to be a male. It may be a dwarf specimen of *C. championi* Parry or *C. opacus* Boil. I am not entirely satisfied that these are really distinct.

I have been able to examine types of both *C. (Neolucanus) latus* Boil. (1902) from Burma and *apricans* Möll. (1912) from Assam and have found

them to belong to the same species. Boileau's name, as the earlier one, must be adopted.

I believe Kriesche's pronouncement (1922), that *C. fallaciosus* Boil. (or *fruhstorferi* Meyer-Darcis, the two names seem to have been published almost simultaneously in November 1901), *C. salvazae* Pouill. and *C. sinensis* Westw. are colour-phases of the well-known *C. cuvera* Hope, will prove to be correct.

The abundant Indian *C. castanopterus* Hope shows a marked tendency to develop imperfectly defined local races. *Neolucanus melas* Did. (1930) is a dark race of it, while *N. elongatulus* Möll. (1905), *pallidus* Boil. (1914) and *flavipennis* Boil. (1914) must be considered pale races. The var. *flavipennis*, in the type as well as in two specimens (from the Ruby Mines, Burma) in the British Museum has the peculiarity of a 4-jointed, instead of 3-jointed, club to the antenna but, since two other specimens taken at the same time are practically normal, this cannot be considered of much weight.

For the nearly related *C. vicinus*, Pouillaude (1913) has given the total length as 21 mm., probably a misprint, as his figure, said to be of the actual size, measures 38 mm. A series of examples in the British Museum, which I believe to represent this species, measure from 29 mm. to 33 mm.

Other synonyms in this genus are the following :—

C. marginatus Wat. = (*Neolucanus dohertyi* Houlb. (1914)). I have compared the types.

C. baladeva Hope = (*Neolucanus ollenbachi* Did. (1930)). Dr. Didier has incorrectly stated that this is related to the parti-coloured *C. marginatus* Wat., a very different species. He intended to refer to the uniformly dark insect suggested by Waterhouse, but without good reason, as possibly the male of *marginatus*, of which he knew only the female.

Leptinopterus.

Boileau has recorded (1913, *Trans. ent. Soc. Lond.* 1913 : 236) that the type of *Leptinopterus polyodontus* Hope & Westw. is a specimen of *L. ibex* Billb. The species described under the name *polyodontus* by Burmeister is quite a different one and, as I am not aware that it has received any other name, it may be called ***Leptinopterus burmeisteri*** nom. n.

Dorcus.

In describing *Metopodontus lunulatus*, from Central Africa, in 1911, and *M. flavomaculatus*, from the Congo, in 1912, Möllenkamp referred to the similarity of their pattern of yellow and black to that of an Erotylid beetle, *Encaustes*. Five years later, in 1917, I described, as *Encaustes africana*, the first species of that genus recorded as African. This was found at Kasongo, on the Upper Congo, and its markings so much resemble those of the quite peculiarly decorated Lucanids that, both being timber-haunting insects and the Erotylid probably nauseous, the Lucanids can be reasonably regarded as mimics of the other. It seems most likely that both Möllenkamp's names are synonyms of *Homoderus variegatus* Boil., as suggested by Kriesche (1926), who has referred the insects to a new subgenus (*Homoderinus*) of *Prosopocoelus*. It is significant of the vagueness of the accepted genera that each of these three authors has used a different generic name. I regard all as synonyms of *Dorcus*.

In a note by Westwood appended by Parry to his description of *Ditomoderus* it is clearly stated that this was intended as a subgenus and there

is no good ground for separating it from *Dorcus*. The antennae have a 4-jointed club, but there are various species of *Dorcus* of which the club can be equally well described as 4-jointed.

Rhaetus Parry, *Rhaetulus* Westwood and *Pseudorhaetus* Planet were all devised for species of this genus of which large males show a fantastic development of the mandibles, while the females can only be regarded as congeneric. *Rhaetulus* was intended as a subgenus only by Westwood, who seems to have consistently maintained the insufficiency of sexual characters for establishing genera. *Rhaetulus speciosus* Boileau (1911), bearing a name preoccupied by his *Metopodontus speciosus* (1904), may be called *boileaui* Didier, the name bestowed in 1925 upon one of its various colour-phases. It is evident from the description that *Rhaetulus sauteri* Möll. (1912) is a small male of *R. crenatus* Westw.

Tetrarthrius Did. (1926) and *Capreolucanus* Did. (1928) also owe their existence to the curiously shaped mandibles of well-developed male specimens and *Falcicornis* Planet rests on no firmer foundation. *T. castaneus* Did., bearing a name used long previously, may be called ***Dorcus rufobrunneus*** nom. n.

Gonomotopus and *Pelecognathus* of Houlbert (1915) are based on similar features, not to be found in females and in all probability absent in small males, and the former seems to differ in no important respect from *Cyclorasis*, proposed by Thomson for *platycephalus* Hope, but since regarded as superfluous.

Eligmodontus Houlb. (1915) was formed for a male specimen with the inner edges of its mandibles serrated, apparently a rather poorly developed example of a species related to *Dorcus foveatus* Hope. The diagnosis of *Durelius* Houlb. (1915), although drawn from both sexes, includes no single distinctive feature except the shortness of the male mandibles. In formulating this genus Houlbert was unduly influenced by the remark of Parry (which he reprints) in describing the female, that "the slender antennae and unarmed posterior (i.e. hind) tibiae are so utterly anomalous as to leave some doubt whether it be really a female." If Parry had seen the now well-known *Dorcus rubrofemoratus* Voll. he would not have failed to recognise the very close relationship of the two species pointed out by Boileau. Another nearly related species may be described here.

***Dorcus wardi* sp. n.**

Black and shining, with the mandibles, head and pronotum of the male duller but smooth, the head of the female rather roughly and irregularly punctured and the outer half of the elytra very densely punctured and opaque. The body is rather narrowly elongate, parallel-sided and convex, the sides of the elytra almost straight and the shoulders not sharply angular. The ocular canthus reaches the middle of the eye. The middle tibia bears a strong lateral spine and the hind tibia a feebler one.

♂. The head is short, almost as wide as the pronotum, the lateral angles sharp but not produced and the sides contracted behind the eyes. The entire upper surface is unpunctured and very smooth. The pronotum is short and broad, the lateral angle rather sharp. The mandibles are far apart at the base, flat, gently curved externally, with a short, broad, 2-pointed interior branch situated nearer the tip than the base.

♀. The head bears a pair of rather close and prominent, transversely placed tubercles, is a little hollowed and rather finely and closely punctured in front of these, and less finely and not closely punctured behind them. The posterior part is smooth and shining and the sides are closely rugose. The pronotum is very smooth and shining except at the lateral margins, where it is rugosely punctured. The front angles are bluntly produced,

the sides gently curved to the lateral angle and from there abruptly contracted to the base.

♂. Length (with mand.) 39 mm.; (without mand.) 30 mm.; breadth 13 mm. ♀. Length 28–30 mm.; breadth 11.5–12.5 mm.

S.E. TIBET: Zayul, Di Chu Valley, 11,000 ft., August (*F. Kingdon Ward* and *R. J. Kaulback*). UPPER BURMA: Seinghku Valley, 9500 ft., July (*F. Kingdon Ward*).

It is most closely related to *D. sinensis* Boil. and *semenowi* Jak., but the lateral angulation of the pronotum is sharper in both sexes, the anteocular angle of the male is sharp, the front angle of the pronotum blunt and not produced and the sides evenly curved to the lateral angle. In the female the sides of the pronotum are more rugose than in the related species. The mandibles of the male are relatively broader and the narrow internal branch found in those species is here replaced by a broad dilatation at the same point.

The Australian insect described by Westwood as *Dorcus carbonarius* in 1863 and afterwards identified as *hydrophiloides* Hope & Westw., was in 1870 given a generic name *Pseudodorcus* by Parry, who distinguished it from *Dorcus* only by its small head and mandibles, broader form and rounded thorax. Boileau, who redescribed at length the typical specimens in London and Oxford (1913), also discussed its peculiarities in a note printed by Dr. Didier (1926) and pointed out its resemblances to *Dorcus torresensis* Deyr. He found its chief distinctive feature in the strongly tridentate four posterior tibiae. But these differ only in a slight degree from those of other species of *Dorcus*, e.g. *D. opacipennis* and *rationcinativus*. It is especially characteristic of the female and I regard *hydrophiloides* as a *Dorcus* in which the sexual dimorphism is probably reduced to its lowest level in this genus. Dr. Didier has named a related species *Pseudodorcus nitidus*. On account of the earlier *Dorcus nitidus* Kirsch, this name may be changed to **Dorcus laevis** nom. n.

As to the genus *Dorculus* Did. (1930) although the description mentions no distinctive character it is not possible to form an opinion upon it until further particulars are available. The two species placed in it have probably little relationship.

I have referred previously (1937, *Trans. R. ent. Soc. Lond.* **85**: 244) to the impossibility of separating specifically *Dorcus titanus* Boisd. and *platymelus* Saund. Nagel (1924) has described and figured a specimen to which he has given a varietal name *typhoniformis*, referring it to the species *platymelus* and comparing it with *D. titanus* var. *typhon* Boil. Probably its Chinese habitat alone led him to assign it to *platymelus*, for it may be noted that it does not greatly differ from the type of *titanus*, as figured by Boisdual. That specimen was an inhabitant of Celebes. A rather similar specimen in the British Museum is from the Philippine Is. and another from South China with mandibles of similar form, developed in a still more pronounced degree, has been figured and described by Didier under the name *Eurytrachelus prometheus* (1925, *Bull. Soc. ent. France* **1925**: 251). The names of these various forms being applicable to large males only are hardly entitled to be considered varietal.

Eurytrachelus tethys Did. (1929) is a form of the male *D. tityus* Hope and a smaller form of the same species is *affinis* Pouill. (1913), but the female associated by Pouillaude with the latter is probably that of another species.

Cladognathus bouvieri Did. (1936) is a small male of *Dorcus giraffa* F.

The name *formosanus* has been given to three Formosan species of *Dorcus*, the first being *Prismognathus formosanus* Nagel (1928). Another is *Leptino-*

plerus formosanus Miwa (1929), unaccountably attributed to a South American genus although nearly related to the common *D. rectus* Motsch. This may be called ***Dorcus formosae*** nom. n.

The third species, *Dorcus formosanus* Miwa (1929), described and figured from a single male specimen, is evidently the great Indian *D. antaeus* Hope, the occurrence of which so far east of its known habitat is surprising and not impossibly due to some accident.

Prosopocoelus crassus Did. (1931), from "San Thomé, Java", is the very common African *Dorcus antilope* Swed. A co-type in the British Museum, bearing Didier's name in his own handwriting, was taken in the West African island of San Thomé "on the road to Java". *Prosopocoelus hanningtoni* Wat. is the nearly related *D. natalensis* Parry and *Prosopocoelus curvidens* Nonfr., is evidently a male of *D. serricornis* Latr. with highly developed mandibles.

The wide-ranging *Dorcus bison* Oliv. is found in Northern Australia and I have no doubt that *Metopodontus magnificus* Möll. (1906) belongs to that species.

Boileau gave the name *Prosopocoelus parryi* to the second *Lucanus bulbosus* of Hope but, on account of the earlier *Dorcus parryi* Thoms., I propose to change this to ***Dorcus polymorphus*** nom. n.

The name of *Gnaphaloryx davidis* Fairm., the near relationship of which to the well-known *D. parallelipipedus* L. was so strangely overlooked by Fairmaire, must also be changed on account of the earlier *Prismognathus davidis* Deyr. It may be called ***Dorcus davidianus*** nom. n.

It seems likely that comparison of a sufficient number of specimens will show that *Eurytrachelus castelnaui* Deyr., *hansteini* Albers, *prosti* Boil. and *mandibularis* Möll. are inseparable. Probably all are forms of *D. reichei* Hope.

A few other new synonyms are the following:—

- D. sewertzowi* Sem. = (*Dorcus rugatus* Did. (1927)).
- D. submolaris* Hope = (*Eurytrachelus fuliginosus* Did. (1928)). I have examined both the types.
- D. dentifer* Deyr. = (*Prosopocoelus parallelus* Did. (1931)). Type of *parallelus* in the British Museum.
- D. buddha* Hope = (*Prosopocoelus cardoni* Did. (1927)). Co-type of *cardoni* in the British Museum.
- D. subnitens* Parry = (*Prismognathus parvus* Did. (1928)). Co-type of *parvus* in the British Museum.
- D. bisignatus* Parry = (*Hemisodorcus rufonotatus* Pouill. (1913)).
- D. crenulidens* Fairm. = (*Prosopocoelus denticulatus* Boil. (1901)).

Apterocyclus.

The seven species attributed to this Hawaiian genus by Sharp in 1908 were reduced to one by Dr. Van Dyke in 1922. Since he has studied over a hundred specimens without discovering grounds for specific differentiation, his conclusion that all these belong to a single variable species cannot be contested. The type of *A. waterhousei* Sharp, however, differs so greatly from the other six types in the British Museum that I am unable to adopt his view that this species is not separable from *A. honoluluensis* Wat. The very much shorter and stouter legs, the straight sides of the pronotum and its abrupt hind angles, the flattened sides of the elytra and sharply angular apices separate it widely from all the other specimens known to me. The

stout legs suggest the female sex but the specimen is a male and the sexes of *Apterocyclus* do not differ in this way. It seems likely that, as in other wingless genera (e.g. *Colophon*), it may be found that there are several geographically isolated species of very narrow range in the genus.

Scortizus.

The genus *Scortizus* was formed by Westwood in 1834 for the South American *Lucanus maculatus* Klug and in 1845 *Sclerognathus* was devised for *costatus* Hope & Westwood. That name, being already in use, was replaced by *Sclerostomus* in 1847 by Burmeister, who added five other species. The type-species *costatus* was transferred to *Scortizus* in Van Roon's catalogue and, if this is justified, *Sclerognathus* and *Sclerostomus* being, according to Burmeister, names for the same genus, become synonyms of *Scortizus*. The type-species *maculatus* and *costatus* have little resemblance but there is a rather important feature, apparently overlooked, which is in favour of Van Roon's view. The three club-joints of the antenna, in these and other species, instead of being clothed with fine hair in the usual way, are extremely smooth and shining, with the sensory surface confined to the terminal part and sharply circumscribed by a definite line. These joints are very short, closely articulated and probably scarcely separable. The antennae of the Oriental genus *Figulus* have the same character. Four of Burmeister's six species of *Sclerostomus*, viz. *costatus* H. & W., *cruentus* Burm., *plagiatus* Burm. and *cucullatus* Bl., belong to *Scortizus*, as thus defined, as well as *maculatus* Kl., *buckleyi* Wat., *gounellei* Boil., *tuberculatus* Sol., *ruficollis* Lued. and *zikani* Ohaus. Many of these show a tendency to the production of the pronotum in front, culminating in a well-defined horn in *cucullatus* Bl. The last and other related species inhabiting Chili were in 1851 referred to the genus *Dorcus* by Solier, who proposed for them two subgeneric names, *Epipedus* and *Pycnosiphorus*. *Epipedus* had been used twice previously but *Pycnosiphorus*, of which the type is *mandibularis* Sol., may be adopted for that and the numerous other species, at present catalogued as *Sclerognathus*, which cannot be referred to *Scortizus*. A very broad depression in the middle of the pronotum is characteristic of many of the species of *Pycnosiphorus*.

The *Lucanus bacchus* Hope & Westwood, called *Sclerostomus darwini* by Burmeister and *Dorcus darwini* by Solier, is a rather isolated insect, with a very smooth rounded pronotum. It is destitute of wings and has the elytra completely fused together and of a peculiarly short rounded form. The four posterior tibiae have each a very strong lateral spine and a small supplementary spine preceding it. These features are sufficient to distinguish it from *Dorcus*, to which, like *Apterocyclus*, it is related. For this species (*Lucanus bacchus* Hope & Westwood) I propose the new genus **Apterodorcus** gen. n.

Figulus and *Cardanus*.

Cardanus linearis Did. (1929), of which Dr. Didier has kindly sent me the type for examination, is a species of *Figulus*.

The widespread *Figulus fissicollis* Fairm., like other widely distributed species, is rather variable and has received many names. One of these is *lilliputianus* Westw. and another is *monochromus* Did. (1930), of which the British Museum contains specimens taken together with the type by Muir.

Figulus humeralis Did. and *nubilus* Did. (1930), from the small island of Larat, are probably identical.

Three species of *Cardanus* from Sumatra are at present known, *C. sulci-*

thorax Perty (*sulcatus* Westw.), *costatus* Rits. and *sericeus* Boil. A fourth appears to be undescribed.

Cardanus reticulatus sp. n.

Very dark pitchy black, with a very inconspicuous clothing of minute pale setae, most apparent upon the legs, the lower surface and the posterior part of the elytra. It is a smaller and rather less elongate and cylindrical species than *C. sulcithorax*. The head is slightly hollowed above, strongly punctured, with the lateral margins rounded and not angulate. The mandibles are less curved than those of *C. sulcithorax* and only feebly toothed. The pronotum is as long as it is wide, very strongly and densely punctured, with a shining median tubercle a little behind the front margin and a feeble groove extending from this to the base. The elytra also are densely punctured, but the punctures are partly coalescent and show only traces of linear arrangement, the extremely narrow interstices forming a fine network. Upon the anterior half of each elytron there is an imperfect costa at a little distance from the suture. The entire lower surface is strongly but less densely punctured.

Length 11 mm.; max. breadth 3 mm.

SUMATRA: Korinchi, Sungei Kombang, 4500 ft. (*C. Boden Kloss*, April).

Cardanus sulcithorax and *costatus* are found in Borneo as well as Sumatra. *C. sericeus* is described by Boileau as bearing upon the elytra extremely regular punctured striae. The short golden hairs with which the elytra are clothed are represented in *C. reticulatus* by very minute and inconspicuous setae and the punctured striae are replaced by an irregular network formed by the narrow interstices of the partly coalescing punctures. In *C. sulcithorax* there is a deep pit in each front angle of the pronotum, but there is no trace of this in *C. reticulatus* nor apparently in the other species of the genus.

Aegus, Aegotypus, Lissotes.

A genus *Xenostomus*, distinguished from *Aegus* by the obliteration of the suture dividing the mentum and submentum, was proposed by Boileau; but this suture is quite normal in the female and distinctly visible in small males. It is therefore useless as a generic character and nothing remains by which a separate genus can be recognised.

Another genus *Paraegus*, also distinguished only by a feature of the large male, the form of the mandible, was proposed in 1888 by Gahan, who considered it intermediate between *Aegus* and *Lissotes*. The female has all the characteristics of *Aegus*, as have small males, and the genus cannot be retained. Like *Aegus*, it has perfect wings, whereas all the species of *Lissotes* appear to be flightless and to have the elytra immovably united. They also have the eyes undivided, while those of *Aegus* are completely divided, and the sculpture of the upper surface is not the same.

In 1939 I figured and distinguished three species of LUCANIDAE from the Caroline Is. One of these, *Aegus alternatus* Fairm., was described by Boileau in 1910 as *Metallactulus bennigseni*, which is therefore a synonym. Although his figure is incorrect in the two important features—the completely divided eyes and the paired striae of the elytra—the quite characteristic shape of the insect renders its identification sufficiently certain. It appears to be a rather abundant insect in Ponape Island. *Metallactulus* has the eyes undivided and, as I have already recorded, is synonymous with *Dorcus*.

A related species of *Aegus*, also with geminate-striate elytra, is *A. woodfordi* Wat. A later name for this is *Aegus barbatus* Nagel (1928). Waterhouse's

type is a male of small size, which, as in other species, shows an approach in the puncturation of its upper surface to that of the female.

Aegus subnitidus Wat. is a synonym of *A. laevicollis* Saund. The types of both are in the British Museum.

The habitat attributed to *Aegus chelifera* MacL. by its author was not Australia, as stated by Parry and Boileau, but the vague "Australasia", indicating that its actual origin was uncertain. It seems very doubtful whether *Aegus specularis* Jak. can be distinguished from this species notwithstanding its flatter elytral intervals.

Since I have found it necessary to refer *Gnaphaloryx dilaticollis* Parry to the genus *Aegus* (in which, unlike *Gnaphaloryx*, the eyes are completely divided) the later-dated *Aegus dilaticollis* Rits. (1900) must be re-named and I propose to call it ***Aegus laticollis* nom. n.**

The authors of the name *Aegus javanicus* Oberth. & Houlb. (1914) evidently suspected the identity of the species with *Aegus pengalenganus* Van de Poll, taken in the same locality. The British Museum contains co-types of this, which leave no doubt about the matter.

***Aegus delicatus* sp. n.**

Dull brownish-black, the sides and apices of the elytra, as well as the legs, clothed with short grey setae.

♂. The head and pronotum are closely and rugosely punctured, the head rather convex, its front margin bearing two slight rounded prominences close together in the middle and the lateral margins produced outwards behind the eyes. The mandibles are a little longer than the head and evenly curved, each bearing a long blunt basal tooth, the two teeth meeting in the middle line, and dilating to form another blunt and not very prominent tooth between the basal one and the tip. The upper surface of the pronotum is uneven, its sides are very rugose, the lateral margins nearly straight and parallel and the angles very blunt. The elytra are deeply striate, except at the sides, which are densely rugose, the intervals are closely punctured, except towards their extremities, the 3rd and 5th united behind, the outer margins are rounded, a little contracted at the base and the apices are produced.

Length (with mandibles) 13 mm.; (without mandibles) 11 mm. Max. breadth 4.5 mm.

MALAY PENINSULA : Perak (*W. Doherty*).

Two male specimens.

Although the very closely sculptured upper surface, no doubt to be found also in the female, may suggest the possibility that the specimens described represent a low development of the species, the form of the mandibles seems to render it more probable that no very much higher development is attained. There is some affinity with the Javan *A. preangerensis* V. de Poll in the sculpture and the form of the mandibles, but the latter have in *A. delicatus* an additional tooth, the sculpture is denser and the elytra are shorter, more ovate and more produced behind.

The species next described was determined by Boileau, with a note of interrogation, as *Aegus oxygonus* Jakowl., but that appears to me, from the description, to be a quite different insect, closely similar to, if not identical with, the later described *Aegus gracilicornis* Möll. It is clearly distinguished from the new form by the very slender, widely separated mandibles, with acute basal tooth, and the process behind the eye, said to be rounded, has evidently not the narrow shape found here. Although considerably larger and without trilobate margins to the thorax, the peculiar form of the head,

thorax and elytra of this insect reveals indisputably a close relationship to the type-species of *Aegotypus*.

***Aegotypus auritus* sp. n.**

Dark chocolate-brown, the upper surface dull and coarsely and shallowly punctured, except upon the dorsal part of the elytra, the punctures filled with yellowish matter and each bearing a very minute short seta. The legs and the extremities of the elytra are clothed with short stiff grey hairs.

♂. The head is broad and flat, strongly and rather closely punctured, the front margin gently excised in the middle, with a small rounded prominence on each side of the excision, the sides provided with bluntly angular lobes, directed obliquely forward, behind the eyes. The mandibles are rather longer than the head, moderately broad and rather feebly curved, the upper edge having a strong truncate internal branch at the base and a slight blunt tooth about the middle, the lower edge a well-marked but gradual dilatation just before the tip. The pronotum is short, broad and strongly punctured. The front angles are obliquely produced, forming strong blunt lobes, the lateral margins are strongly but not sharply angulate near the middle and then strongly contracted to the base, which is narrow. The elytra are rounded at the sides and have each 6 or 7 deep striae upon the dorsal part, the sutural interval fairly closely and the remaining intervals very finely and scantily punctured, the outer margins broad, flat, strongly punctured and setose and the shoulders sharply angular. The legs are rather slender, the front tibia with three fine teeth before the terminal fork, the middle tibia with two lateral spines. The metasternum is coarsely punctured and the abdomen is clothed beneath with yellow setae.

The female is unknown to me.

Length (with mandibles) 17–22 mm.; (without mandibles) 14–17 mm. Max. breadth 7–8 mm.

NORTH BORNEO: Mt. Kina Balu.

There are three male examples in the British Museum.

Generic names newly treated as synonyms in this paper.

Dorcus MacL., 1819.

syn. *Ditomoderus* Parry, 1864.

Rhaetus Parry, 1864.

Rhaetulus Westwood (subgenus), 1871.

Pseudorhaetus Planet, 1899.

Tetrarthrius Didier, 1926.

Capreolucanus Didier, 1928.

Gonometopus Houlbert, 1915.

Pelecognathus Houlbert, 1915.

Eligmodontus Houlbert, 1915.

Durelius Houlbert, 1915.

Pseudodorcus Parry, 1870.

Homoderus Parry, 1862.

Scortizus Westw., 1834.

syn. *Sclerognathus* Hope & Westwood, 1845.

Sclerostomus Burm., 1847.

Aegus MacL., 1819.

syn. *Xenostomus* Boileau, 1898.

Paraegus Gahan, 1888.

Generic names treated as synonyms in 1935, *Trans. R. ent. Soc. Lond.* **83**.

Lucanus Scop., 1763.

syn. *Pseudolucanus* Hope & Westwood (subgenus), 1845.

Calcodes Westw., 1834.

syn. *Odontolabis* Hope & Westwood (subgenus), 1845.

Neolucanus Thoms., 1862.

Dorcus MacL., 1819.

syn. *Cladognathus* Burm., 1847.

Metopodontus Hope & Westwood (subgenus), 1845.

Prosopocoelus Hope & Westwood (subgenus), 1845.

Prismognathus Motsch., 1860.

Eurytrachelus Thoms., 1862.

Hemisodorcus Thoms., 1862.

Falcicornis Planet, 1894.

Aegus MacL., 1819.

syn. *Alcimus* Fairm., 1849.

Eubussia Zacher, 1913.

Malieta Kriesche, 1921.

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BOOK NOTICES.

Near Horizons. The story of an insect garden. By E. W. TEALE. 8vo. New York (Dodd, Mead & Co.) 1943. pp. xvi + 319, 95 plates included in the pagination. Price \$3.75.

This book is described as "The travel book of a man who stayed at home": his home being in the United States. It is an extremely beautiful picture book and contains some of the best pictures of insects so far published.

While the text is supplementary to the illustrations, there is much in the contents which the average reader will find of interest and the facts have been checked by accepted authorities.

Many of the illustrations will prove of value to the entomologist, perhaps more particularly some of the close-ups, but it is no exaggeration to say that all of them will give pleasure to any reader who is interested in life in the animal world or in the technique of photographing insects.

Applied Entomology. An introductory textbook of insects in their relations to man. By H. T. FERNALD and H. H. SHEPARD. 8vo. New York and London (McGraw-Hill) 1942. 4th edition. pp. ix + 400, 383 text illust. Price \$3.50.

This book is published in the series McGraw-Hill Publications in the Agricultural Sciences. The first edition appeared in 1921 and the third in 1935.

Since the last edition was published there have been many changes in the practice of controlling insect pests, more particularly in the use of insecticides. New insecticides are discussed in this book only where their use has become accepted generally and the authors give but slight reference to methods and materials of very recent development and which still need further trial to prove them practical.

Where changes in practice have become general, however, special attention is paid to them as well as to the adding of new insects of importance and of new facts about insects discussed in earlier editions.

The chapters dealing with the economic importance of insects and with methods of control have been rewritten and the chapters on Hymenoptera and Animals other than Insects have been rearranged.

Index VI to the Literature of American Economic Entomology. January 1, 1935, to December 31, 1939. Compiled by Mabel COLCORD, edited by E. P. FELT and S. W. BRIMLEY. (*Spec. Publ. Amer. Ass. econ. Ent.* 6.) pp. [xii] + 815 (printed in double column). 8vo. College Pk., Md., 1942.

This volume is the sixth of a series begun in 1905 by N. Banks, and follows closely the pattern of the earlier volumes.

It is arranged alphabetically under the names of the insects concerned, and after each name the references to the literature are given in abbreviated form. Interpolated in the correct alphabetic sequence are such headings as Ants, Apple Insects, Bees, Bibliography, Dusts, Insecticides, and Insects. The major headings are in turn subdivided as, for example: Insects, Immature; Insects, Immigrants; Insects, Increase; Insects, Injurious and Beneficial; Insects, Instincts; Insects, Intelligence; Insects, Iowa; and so forth.

CERATOPOGONIDAE (DIPTERA) FROM EGYPT

By J. W. S. MACFIE, M.A., D.Sc., M.B., Ch.B.

THIS collection of midges was made when I was serving with Nos. 3 and 8 Malaria Field Laboratories in Egypt. I am indebted to my colleagues Dr. W. H. R. Lumsden, the late Dr. S. H. Segerman, and Dr. O. Theodor for some of the specimens, but all the others, unless otherwise noted, were collected by me. Most of the insects were taken in the evening on windows at Moascar, near Ismailia, either in our laboratory, or in our living quarters. There, in February, midges were fairly numerous, in March and April they were abundant, but in May they again became fewer, and by the middle of that month were scarce or had entirely vanished. It was observed on several occasions that they were particularly abundant after dust storms, as if they had sought shelter in buildings from the hot, dry, dust-laden wind. The only species which caused us annoyance by biting were *Holoconops kerteszi* and some of the species of *Culicoides*.

The collection consists of 416 specimens referable to 23 different species, five or six of which appear to be new. They include species of *Holoconops* (1), *Forcipomyia* (4), *Dasyhelea* (7), *Culicoides* (10), and *Alluaudomyia* (1). It is remarkable that these are the only genera represented. More than half the collection (214 specimens) is composed of specimens belonging to the genus *Culicoides*, all to species previously recorded.

The method of description employed is the same as that I have adopted in a number of recent reports. The unit referred to is approximately 3.7 μ . The types of all new species are in the collection of the British Museum (Natural History).

I have to thank Prof. P. A. Buxton, F.R.S., for his kindness in permitting me to examine the collection in the laboratory of his department at the London School of Hygiene and Tropical Medicine.

Holoconops kerteszi (Kieff.).

Bir el Abd, 7-8.vii.1941, 16 ♀, "North lake, on forearm of collector" and "In tents in morning" (Dr. W. H. R. Lumsden). Moascar: ii.1942, 5 ♂, 5 ♀; iii.1942, 7 ♂, 4 ♀; and iv.1942, 1 ♂, all "on windows." Gebel Maryim, near Moascar, 7.iv.1942, 11 ♀, "Biting" (Dr. O. Theodor). Ismailia, near U.S. Club, 9.iv.1942, 1 ♀.

In these specimens, which I take to be the Egyptian species *H. kerteszi*, the metatarsi of the fore legs are armed with a basal and an apical pair of spines, and with one or two spines between them which are usually unpaired. According to Kieffer's key (1921) and to that given by Goetghebuer in Lindner 1934, *Die Fliegen der Palaearctischen Region*, they should therefore be identified as *H. mediterraneus* K., a species found in Algeria, rather than as *H. kerteszi*, in which species it is stated there are five pairs of spines on the metatarsi of the fore legs. Carter (1921), however, found that the metatarsi of the fore legs of *H. kerteszi* bear "a basal and apical pair of slender, pointed spines, and a few (one to four) central, usually unpaired, spines"; and as the number of spines is certainly variable, and because Carter considered that "the exact arrangement of the metatarsal spines is not of specific importance," it may be doubted if *H. mediterraneus* and *H. kerteszi* are really specifically distinct.

In the female specimens from Bir el Abd and Moascar segments 4–12 of the antenna range from about 6 by 7 to 8 by 7 units, 13 about 23 by 8 (max.) units, and sensory hairs about same length as segments, decidedly thicker than longer whorl hairs and about half their length; femora and tibiae dark or darkish brown, tarsal segments paler; spines of both combs at distal end of hind tibia yellowish; hairs on femora and tibiae sparse and short; 5th tarsal segment longer than 4th; lamellae one-fifth to one-sixth length of wing; all claws equal and simple; and the two well-developed spermathecae oval, subequal, measuring in one specimen about $49\ \mu$ by $31\ \mu$ (max.), with the duct narrow and hardly at all chitinised at its commencement.

Male blackish, in many respects quite unlike the insect described by Weiss (1912) as the male of *Mycterotypus laurae*, which Carter (1921) considered to be the same as *H. kerteszi*, but closely resembling yet not identical with the male described by Freeborn and Zimmerman (1934) from specimens taken in California. Head blackish. Eyes bare, widely



FIG. 1.—*Holoconops kerteszi* (Kieff.). Hypopygium of male in ventral view to show general form in unflattened specimen.

separated above. Palpi blackish, third segment not swollen, about same length as terminal segment, with a very small pit. Antennae blackish, with large plume: segments 4–13 ranging from about 7 by 10 to 11 by 7 (max.) units, each bearing a whorl of hairs; 14 and 15 more elongate, their lengths about 16 and 46 units respectively, each with a small sub-basal whorl of hairs, and 15 somewhat dilated towards its end, club-shaped. Thorax and scutellum almost black, shining, with sparse, short, black hairs. Wings colourless, opalescent, length about 1.4 mm., tip bluntly rounded. Bristles along costa quite small. Microtrichia minute, no macrotrichia. Halteres with whitish knobs. Legs with basal segments, femora, and tibiae very dark brown; tarsal segments paler brown. Metatarsi of fore legs armed with a basal and an apical pair of spines, and with one or two unpaired spines between them. Claws on hind legs equal and simple; those on four anterior legs equal but dissimilar, the one simple, the other with a long, delicate basal barb. Abdomen blackish, but not as dark as thorax, with sparse, short hairs. Hypopygium (fig. 1) blackish, differing notably from the rather incomplete figure given by Kieffer (1923) of the terminalia of *H. mediterraneus*, a fact which may indicate that *H. mediterraneus* and *H. kerteszi* are not the same. It is, however, very similar to the

hypopygium of Californian examples of *H. kerteszi* (see Freeborn and Zimmerman) but differs in some details, for example in the form of the clasper. Ninth segment much reduced: tergite almost hairless, with a long rectangular extension posteriorly which ends in two short processes, the tips of which are bent ventrally. Side-pieces narrow, sparsely clothed with stout blackish bristles, concave towards middle line, with a lobe projecting on inner side near base. Claspers short, expanded at base but without the hump shown by the Californian specimens, bearing a few hairs; tips armed with a single almost spine-like process and a small knob which bears a short hair. Median sclerite very dense and dark, somewhat H-shaped (especially if flattened), with the posterior limbs expanded into highly chitinated processes of an irregular shape.

Forcipomyia biannulata I. & M.

Moascar: 15-19.ii.1942, 1 ♂, "on window."

Forcipomyia ingrami Cart.

Moascar: ii.1942, 3 ♂, 2 ♀; iii.1942, 3 ♂, 6 ♀; iv.1942, 1 ♀; and iv.1942, 1 ♀ (*Dr. S. H. Segerman*); all "on windows."

Forcipomyia sp.

Moascar: 15-19.ii.1942, 1 ♀, "on window."

This insect, which is damaged, lacking antennae, bears a single, small, pale spot on the wings, and resembles *F. biannulata* or *F. castanea*. Length of wing about 1.5 mm. Hind legs with dark brown bands on femora and tibiae, the former covering distal half or more of segment and including the joint, the latter darker and occupying middle third of segment. First tarsal segment also infuscated. No scales, and no hastate spines. T.R. about 0.9.

Forcipomyia moascari sp. n.

A rather dark brown species without scales, with the scutellum only slightly paler than the thorax, with unadorned wings and legs, and the T.R. about 2.2.

Male and female. Length of wing about 1.2 to 1.5 mm.; greatest breadth about 0.4 to 0.5 mm. As usual wings of male longer and narrower than those of female.

Head very dark brown. Palpi brown, in male longer and darker than in female: third segment about equal in length to fourth and fifth together, inflated at base (especially in female), with deep pit. Antennae dark brown. In male plume blackish: segments 4-11 successively narrower, ranging in one specimen from 13 by 12 to 12 by 9 units; 12-14 elongate, their lengths 41, 23, and 16 units respectively; 15 about 19 units, ending in a small nipple-like process. In female segments 4-10 slightly narrowed anteriorly, ranging from about 9 by 8 to 9 by 7 units, with pale, pointed, curved spines about same length as segments; 11-15 sub-equal, only slightly longer than 10, about 12 by 6 units, the last ending in a small nipple-like process. The combined lengths of segments 3-10, 4-10, and 11-15 about 75, 62, and 60 units respectively.

Thorax in dried specimens almost uniformly dark brown with a brownish pruinescence or with yellowish shoulder areas, in mounted specimens showing clearly the usual antero-posterior darker bands on dorsum. Scutellum dull, yellowish, only slightly paler than dorsum, but usually darker brown in middle (especially in males); bearing numerous bristles and hairs.

Wings unadorned, well clothed with macrotrichia (especially in females); without scales. Venation normal. Costa not reaching to middle of wing in either sex. First radial cell obliterated; second well formed, small. Halteres with whitish knobs.

Legs rather pale brown, unadorned, with only joints somewhat infuscated; bearing no scales, and no modified bristles. Form of segments, claws, and empodium normal in both sexes. T.R. about 2.2-2.3.

Abdomen dark brown. Spermatheca single, very highly chitinised, sub-spherical, diameter about 41–45 μ ; duct arising obliquely and rather long and wide, about 33 μ by 14 μ . Hypopygium (fig. 2) very dark. Ninth segment in general form similar to that of *F. ingrami*; sternite not excavated in middle line posteriorly, membrane joining it to aedeagus not spiculate. Side-pieces long and narrow; claspers slender, especially towards tips. Harpes somewhat similar to those of *F. corsoni*, short, flat, rods which are straight and rather feebly chitinised at their distal ends, appearing in ventral view as shown in the figure. Aedeagus complicated, its chitinised parts almost black, in ventral view appearing somewhat as shown in the figure. It should, however, be explained that the two lateral sclerites shown at the posterior end are really curved rods directed dorsally, the appearance shown being due to foreshortening.

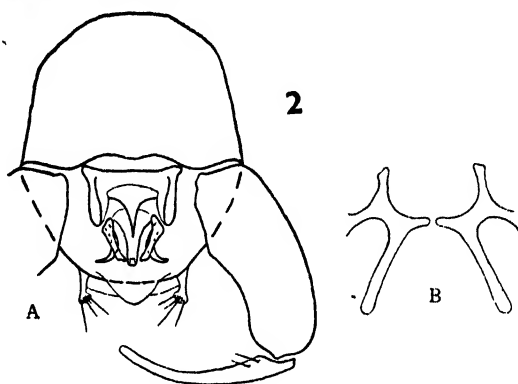


FIG. 2.—*Forcipomyia moascari* sp. n.: ventral view of hypopygium of male. (A) ninth segment and aedeagus; (B) harpes.

Moascar: ii.1942, 6 ♂, 4 ♀; iii.1942, 6 ♂, 16 ♀; iv.1942, 2 ♂, 1 ♀; and iii.1942, 1 ♂ (*Dr. S. H. Segerman*); all "on windows."

This species resembles *F. corsoni* in several respects, notably in the form of the harpes. It is, however, a larger species, and differs in the characters of the aedeagus as well as in other details.

Dasyhelea spp.

The following key may assist in the recognition of the 7 species of *Dasyhelea* found in the collection.

1. Antennae with stylet 2.
Antennae without stylet 3.
2. Ninth sternite of ♂ not notched posteriorly *fusca* C., I. & M.
Ninth sternite of ♂ notched in middle line posteriorly *nyasae* I. & M.
3. Second radial cell longer than broad. No bare areas along veins of wing.
Spermatheca sub-spherical, large, diameter about 100 μ . Ninth sternite
with conical posterior extension ending in two everted processes
moascari sp. n.
- Second radial cell about square 4.
4. Females 5.
Males 8.
5. Bare areas along veins of wings not wide, rather indistinct. Length of
wing 1.1 mm. Legs almost uniformly brownish. T.R. about 2.3
ismailiae sp. n.
- Bare areas on wings distinct 6.

6. Small species, length of wing about 0.75 mm. T.R. 2.2-2.4
inconspicua var. *heliophila* var. n.
- Larger species, length of wing 0.9-1.1 mm. T.R. 2.5-2.7 7.
7. Almost black species. Scutellum almost black. Wings densely clothed with macrotrichia *inconspicua* var. *arenivaga* var. n.
- Dark brown species. Scutellum yellowish in part at least. Wings less densely clothed with macrotrichia *inconspicua* var. *egypti* var. n.
8. Ninth tergite with long processes at posterior angles of unusual shape. Harpes with unpaired process arising from right side *ismailliae* sp. n.
- Ninth tergite with shorter processes of usual shape. Harpes with unpaired process arising from left side 9.
9. Small species, length of wing about 0.75 mm. End of unpaired process of harpes long, slender, projecting beyond aedeagus. Aedeagus short, less than half length of side pieces *inconspicua* var. *heliophila* var. n.
- Larger species, length of wing 0.9-1.1 mm. Unpaired process of harpes short, blunt, scarcely projecting beyond aedeagus. Aedeagus longer, half length of side pieces 10.
10. Black species. Macrotrichia numerous in anal cell
inconspicua var. *arenivaga* var. n.
- Dark brown species. Only very few macrotrichia in anal cell
inconspicua var. *egypti* var. n.

Dasyhelea fusca C., I. & M.

Moascar : 1-6.iii.1942, 2 ♀; iv.1942, 6 ♂, 3 ♀; all "on windows."

These specimens differ slightly from those from West Africa described by Carter, Ingram, and Macfie (1921): for example, the claspers of the male are very dark brown in colour, and the pyriform spermatheca of the female is very highly chitinised. They are larger, too, and the scutellum, shoulder areas, and abdominal markings are buff coloured rather than yellowish. Length of wing about 1.3-1.5 mm. Scutellum bearing 2 lateral bristles and a group of 14-16 bristles and hairs between them. Wings with second radial cell slightly, but in the male not very clearly, longer than broad. Macrotrichia numerous, distributed over the greater part of the wing, including the anal cell in both sexes, but leaving bare areas along the veins. Legs almost uniformly pale brown, with only joints darker. T.R. in both sexes about 2.7. Abdomen with sides and posterior margins of tergites buff.

I refer these insects to *D. fusca*, a species taken originally in West Africa, chiefly because of the characters of the hypopygium which do not appear to differ from those of that species.

Dasyhelea nyasae I. & M.

Moascar : 15-19.ii.1942, 1 ♂, "on window."

The identity of this insect is uncertain, and must remain in doubt until further specimens are available for examination. The hypopygium resembles that of *D. nyasae*, but the legs are not clearly banded.

Dasyhelea inconspicua C., I. & M. var. *egypti* var. n.

Moascar : ii.1942, 6 ♂, 7 ♀; iii.1942, 17 ♂, 24 ♀; iv.1942, 3 ♀; and v.1942, 1 ♂, 2 ♀; all "on windows."

All these insects are, I think, *D. inconspicua*, but owing to war conditions I have not been able to compare them with specimens taken in West Africa. They agree in almost every detail with the description of this species given by Carter, Ingram, and Macfie (1921), but are rather larger, length of wing about

0.9-1.1 mm. The hypopygium of the males is similar and probably indistinguishable. They vary considerably. They range in colour from dark brown to almost black, but in all of them there is some trace at least either in the scutellum, thorax, or abdomen, of the yellowish colour which is a characteristic of the species and is a prominent feature of the majority of the specimens. In some of them the scutellum is entirely yellowish or yellowish-brown, in some it is yellowish in the middle but darker at the sides, and in others, especially in males, the whole scutellum is infuscated. The scutellum often bears one or two bristles in addition to the usual 2 lateral and 4 centro-marginal bristles, 2 lateral and 5 centro-marginal being the most common, and it sometimes bears also a few (one to four) small hairs. One female with 2 lateral and 6 centro-marginal bristles and 4 small hairs which was especially examined did not seem to differ in any respect from insects with the more usual armature. The amount of yellow colour visible on the thorax also varies considerably; and the knobs of the halteres, usually white or cream-coloured, may in some individuals be brown.

The wings are well clothed with macrotrichia which, in the female, cover almost the whole surface with the exception of the radial areas, and are numerous both in the anal cell and between the branches of Cu, but leave well-defined bare areas along the veins. In the male, the macrotrichia are more scanty: in the anal cell there are only a very few and these are all, or nearly all, arranged along the anal vein, and between the branches of Cu there are also only a very few, usually only about half a dozen.

The legs are usually almost uniformly rather pale brown. In the darker individuals, however, the femora and tibiae are distinctly darker than the proximal segments of the tarsi, but they are never very dark or blackish. The knees are always dark. The T.R. is about 2.5-2.7, rather less in the male than in the female.

The hypopygium of the male agrees with the description given by Carter, Ingram, and Macfie. It differs from that of the single male taken at Nifisha and referred to later. The finger-like processes on the ninth tergite are well developed but not very long. The aedeagus is about as long as it is broad at its base (11:12 units), about half the length of the side-pieces. The unpaired process of the harpes, which arises from the left side, is short, and hardly projects at all beyond the end of the aedeagus. For this reason it is not easily seen, the aedeagus obscuring a good view of it. It ends rather bluntly.

D. arenosa, a species taken at Cairo and described by Kieffer (1925), may be the same as this insect, but the description given is insufficient to enable it to be distinguished from a number of allied species found in Egypt and neighbouring countries.

***Dasyhelea inconspicua* var. *heliohilla* var. n.**

Nifisha, near Ismailia, 4.vii.1941, 1 ♂, 2 ♀, and one inter-sex form. Found floating on the surface of a small pool of highly mineralised water in a sandy waste, exposed to the full glare of the sunshine, without any shade at all.

These specimens agree well with the description given by Carter, Ingram, and Macfie (1921) of West African examples of *D. inconspicua*. They are very small insects, length of wing only about 0.75 mm., and the scutellum bears only 2 lateral and 4 (5 in male) centro-marginal bristles, and no small hairs. The wings (female) bear numerous macrotrichia which cover the greater part of the surface excepting the radial areas, and are numerous in the anal cell and between the branches of Cu. The bare areas along the

veins are distinct. The T.R. is about 2.2-2.4, that is less than in the preceding species. The single spermatheca is well chitinated, oval, about 40μ by 30μ , and the duct, which arises a little obliquely, is chitinated for only a short distance, about 3-4 μ , at its commencement. The hypopygium of the male is similar to that of West African specimens, but the following apparent differences may be noted. In the single male available for examination no finger-like processes are visible on the ninth tergite, the aedeagus is shorter, its length less than its basal width (9:12), less than half the length of the side-pieces (9:25), and the unpaired process of the harpes ends in a long slender point which extends posteriorly some distance beyond the aedeagus.

***Dasyhelea inconspicua* var. *arenivaga* var. n.**

An almost black species closely resembling *D. inconspicua* var. *egypti* but with the wings more densely clothed with macrotrichia, and the femora and tibiae very dark brown.

Male and female. Length of wing about 0.97-1.1 mm., greatest breadth about 0.35-0.4 mm.

Head almost black. Eyes densely hairy. Palpi very dark; third segment without pit. Antennae blackish. In male, plume blackish: segments 4-11 in one specimen ranging from 9 by 11 to 11 by 7 units; 12-14 binodose, their lengths about 23, 25, and 22 units respectively; 15 about 22 by 7 (max.) units, tapering to a blunt end, without stylet. In female, segments 4-14 forming an almost continuous series; segments 4-10 in one specimen ranging from 8 by 7 to 10 by 6 (max.) units, only slightly narrowed anteriorly, bearing curved, pointed spines which are colourless and about the same length as the segments; 11-15 only slightly more elongate, 11-14 sub-equal, about 11 by 5 (max.) units, 15 slightly longer, about 16 units, and ending in a blunt process, but without stylet. The combined lengths of segments 3-10, 4-10, and 11-15 about 73, 63, and 62 units respectively.

Thorax almost black. Scutellum almost black; bearing apparently only 2 lateral and 4-5 centro-marginal bristles.

Wings with veins enclosing radial cell infuscated so as to form a dark spot about middle of anterior border. Macrotrichia numerous, more dense than in *D. inconspicua* var. *egypti*, covering nearly whole surface excepting radial areas. Bare areas along veins distinct, but narrow. Costa extending nearly half length of wing. First radial cell obsolete; second quite small, almost square. Fork of Cu slightly proximal in female, slightly distal in male, to level of end of costa. Halteres with blackish stems, and knobs which contain a yellowish substance and are whitish in females, deeply infuscated or dark brown in males.

Legs with femora and tibiae very dark brown or blackish, much darker than proximal segments of tarsi. T.R. about 2.1 in male, 2.5 in female. Form of segments and claws normal.

Abdomen almost black. Spermatheca single, highly chitinated, sub-spherical, diameter apparently about 41μ . Hypopygium similar to that of *D. inconspicua* var. *egypti* and perhaps indistinguishable from it. It is, however, blacker and more highly chitinated, and the finger-like processes of the ninth tergite appear to be slightly longer.

Moascar: ii.1942, 1 ♀; iii.1942, 3 ♂, 1 ♀; all "on windows."

In the dried condition these insects appear to be entirely black, but in their morphology they resemble *D. inconspicua* in almost every detail. The thorax and scutellum are both almost black, without any yellowish adornment. The legs are not almost uniformly brown, as in *D. inconspicua*, but have the femora and tibiae dark or very dark brown, much darker than the proximal segments of the tarsi. The only clear morphological difference I have detected is in the wings. The wings are more hairy, the macrotrichia

more dense, and covering a greater part of the membrane. This is especially apparent in the males, for in them macrotrichia are abundant in the anal cell and between the branches of Cu, whereas in the specimens which I have referred to as *D. inconspicua* var. *egypti* there are only a very few macrotrichia in the anal cell and they are all, or nearly all, distributed along the anal vein, and between the branches of Cu there are also only a very few macrotrichia, fewer than a dozen. The hairiness of the wings of these males is indeed about as great as that of the females of *D. inconspicua* var. *egypti*.

So far as can be judged without actually comparing specimens, these insects resemble closely those from the Marquesas and Society Islands for which I proposed (1933) the name *D. pacifica*.

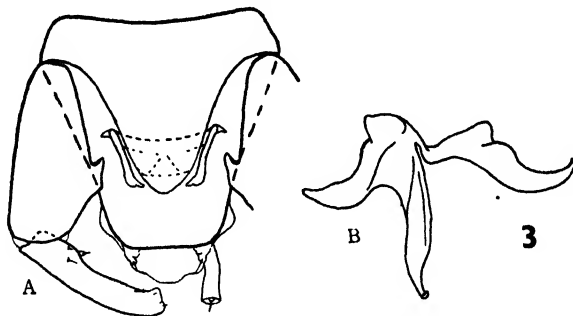


FIG. 3.—*Dasyhelea ismailiae* sp. n.: ventral views of hypopygium of male. (A) ninth segment and aedeagus; (B) harpes.

Dasyhelea ismailiae sp. n.

An almost black species with the scutellum yellowish, the legs almost uniformly pale to darkish brown, and the wings with only narrow or rather indistinct bare areas along the veins.

Male. Length of wing about 1.1 mm., greatest breadth about 0.34 mm.

Head almost black. Eyes densely hairy. Palpi brown, long and slender, third segment sub-cylindrical, without pit. Antennae blackish: segments 4–11 gradually narrowing from about 9 by 10 to 10 by 7 units; 12–15 elongate, lengths about 20, 25, 18, and 18 units respectively, 12–14 binodose, 15 without stylet.

Thorax almost black with greyish pruinescence, anterior angles with small yellowish patches. Scutellum yellowish with sides slightly darker; bearing two lateral and 4–5 centro-marginal bristles, and one or two small hairs.

Wings unadorned, radial veins only slightly brownish. Macrotrichia abundant, covering almost whole wing excepting radial areas but leaving rather narrow bare areas along veins, numerous in anal cell and between branches of Cu. Costa extending about half length of wing. Second radial cell of usual form, small, almost square. Fork of Cu well distal to level of end of costa. Halteres with whitish knobs.

Legs almost uniformly rather pale to darkish brown, with knees dark. Form of segments and claws normal. T.R. about 2.3.

Abdomen blackish. Hypopygium of male (fig. 3) very dark, in general form similar to that of *D. dehalperti* or the Hawaiian species *D. hawaiiensis*. Ninth sternite without bristles, prolonged posteriorly in middle line as conical process. Ninth tergite with strong but rather scanty bristles, bearing at posterior angles a long process dimpled at its end and armed with a stout bristle (cf. *D. hawaiiensis*). In the figure this process is shown on one side only. Side-pieces without lobe-like projections. Claspers very dark at base, with broad blunt ends; bearing on inner side near base three small bristles, one of which

is mounted on a short process. Harpes very asymmetrical and folded variously, in one specimen appearing in ventral view as shown in the figure; general form similar to those of *D. dehalperti*, that is consisting of an irregular transverse strip of chitin attenuated in middle with a long unpaired process arising from it on the right side which tapers distally and is bent ventrally at its tip. Chitinised part of aedeagus as shown in figure.

Moascar : 22-26.ii.1942, 3 ♂; 1-6.iii.1942, 2 ♂; all "on windows."

Female. One damaged female, taken at the same time and place as three of the males, may be the female of this species. It is a dark brown insect, not so dark as the males, but of about the same size. Length of wing about 1.1 mm., greatest breadth about 0.44 mm. Its chief characters are as follows. *Head* blackish. Antennae mostly missing, but basal segments very dark brown, much as in *D. inconspicua*. *Thorax* very dark brown, not blackish as in males, with larger yellowish areas at shoulders and above wings. Scutellum yellowish-brown, bearing 2 lateral and 5 centro-marginal bristles, and one or two small hairs. *Wings* unadorned but with veins enclosing second radial cell infuscated and thus forming a darkish patch. Macrotrichia abundant, covering whole wing excepting radial areas, and numerous in anal cell and between branches of Cu; bare areas along veins hardly recognisable, not wide and distinct as in *D. inconspicua*. Costa extending fully half length of wing. Second radial cell nearly square, slightly longer than broad, as in *D. inconspicua*. Fork of Cu at about same level as middle of second radial cell. Halteres with whitish knobs. *Legs* almost uniformly brownish, more yellowish-brown than in males, with dark knee spots. T.R. about 2.3. *Abdomen* dark brown, with posterior extremity more yellowish. Spermatheca single, highly chitinised, sub-spherical, diameter about 45 μ ; the duct arising obliquely, and chitinised for only a short distance.

This insect, in fact, lacks distinctive characters. It differs little from the female *D. inconspicua* excepting in the greater hairiness of the wings.

Moascar : 22-26.ii.1942, 1 ♀, "on window."

***Dasyhelea moascari* sp. n.**

A very dark brown species with a yellowish-brown scutellum, dark brown femora and tibiae, the wings well clothed with macrotrichia which do not leave bare areas along the veins, and the second radial cell longer than broad.

Male and female. Length of wing 1.4-1.6 mm.; greatest breadth, 0.45-0.5 mm. As usual wings of male longer and narrower than those of female.

Head almost black. Eyes densely hairy. Palpi dark brown; third segment without pit. Antennae very dark. In male, plume large, blackish: segments 4-11 gradually narrowing from about 11 by 13 to 13 by 8 units; 12-15 elongate, their lengths about 38, 35, 25, and 25 units respectively, 12-14 binodose, 15 ending in a conical process but without stylet. In female, segments 4-10 ranging from about 9 by 8 to 10 by 6-7 units, only slightly narrowed at apices; segments 11-14 more elongate, sub-equal, about 15 by 6 units; 15 slightly longer, about 18 by 7 (max.) units, tapering distally, ending in a short, blunt process.

Thorax almost black. Scutellum dull yellowish-brown; bearing a transverse row of about 11 bristles, and a few (4) smaller hairs.

Wings unadorned, but in females radial cell infuscated and so forming a dark patch about middle of anterior border. Macrotrichia numerous, covering almost whole surface and not leaving bare areas along veins. In male, as in female, numerous in anal cell, and between M and Cu extending almost to base. Costa extending slightly beyond middle of wing. First radial cell obliterated; second well formed, longer than broad. Fork of Cu at about same level as middle of second radial cell. Halteres with whitish knobs which, however, are marked with a dark brown patch.

Legs with all femora and tibiae darkish brown; tarsi with last 2-3 segments and all joints infuscated. Form of segments and claws normal. T.R. about 2.0-2.2.

Abdomen very dark brown. Spermatheca single, well chitinised, sub-spherical, large, diameter about $100\ \mu$; the chitinised portion of duct long, about $40\ \mu$, tapering, arising obliquely. Hypopygium (fig. 4) very dark. Ninth sternite without bristles, with median posterior extension ending in a pair of everted processes with a notch between them. Ninth tergite with numerous strong bristles; lateral processes on posterior margin small. Side-pieces with rounded process on inner side at base. Claspers blackish, but paler at ends, with rather sharp, infuscated tips. Harpes as shown in figure: unpaired process long, slender, finely pointed at extremity. Chitinised portions of aedeagus appearing in ventral view as two lateral rods with pointed ends which are joined at base by a transverse bar.

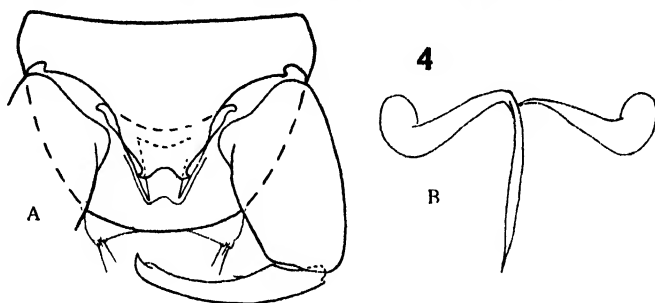


FIG. 4.—*Dasyhelea moasari* sp. n.: ventral view of hypopygium of male. (A) ninth segment and aedeagus; (B) harpes.

Moascar: ii.1942, 3 ♂, 2 ♀; iii.1942, 1 ♂, 2 ♀; and iv.1942, 1 ♀; all "on windows."

Culicoides circumscriptus Kieff.

Moascar: 7-14.iii.1942, 1 ♂, "on windows"; 15-31.iii.1942, 1 ♂, 4 ♀, "on windows"; iii.1942, 1 ♂, "in bungalow" (*Dr. O. Theodor*); iv.1942, 1 ♂, "on window"; iv.1942, 12 ♂, 2 ♀, "in bungalow" (*Dr. O. Theodor*); iv.1942, 26 ♂, 7 ♀, "on windows in bungalow" (*Dr. S. H. Segerman*); v.1942, 1 ♀, "on window."

Culicoides egypti Macfie.

Moascar: 15-19.ii.1942, 1 ♂, 1 ♀, "on windows"; 15-31.iii.1942, 1 ♂, "on window"; iii.1942, 3 ♂, "in bungalow" (*Dr. O. Theodor*); iii.1942, 1 ♀, "on window" (*Dr. S. H. Segerman*); iv.1942, 1 ♂, "on window"; iv.1942, 3 ♀, "on windows" (*Dr. S. H. Segerman*); and iv.1942, 3 ♀, "in bungalow" (*Dr. O. Theodor*).

These insects are the same as the single female taken at Assiut and described by me (1924) under the name *C. distinctipennis* Aust. var. *egypti*. The adornment of the wings, although similar to that of *C. distinctipennis*, differs in having the pale spot immediately distal to the end of the costa divided, as it is in *C. praetermissus*. The single spermatheca is shaped like a peg-top, as it is in *C. distinctipennis*. The hypopygium of the male is, however, unlike that of *C. distinctipennis* but resembles closely that of *C. praetermissus*. Ninth segment with sternite rather deeply excavated, the membrane joining it to aedeagus spiculate only at base. Harpes stout and highly chitinised, tapering distally and curved ventrally, with rather blunt ends. Aedeagus V-shaped, with ventral wall prolonged anteriorly for some distance, as in *C. praetermissus*.

It is probable that *C. pharao*, an Egyptian species described by Kieffer

(1925), is the same as *C. egypti*, but unless the types are still available for further examination it will not be possible to be certain of this synonymy because Kieffer does not describe either the spermatheca or the characters of those parts of the hypopygium of his species which are of greatest specific importance.

Culicoides kingi Austen.

Moascar: ii.1942, 1 ♀; iii.1942, 1 ♂, 3 ♀; and iv.1942, 1 ♀; all "on windows."

As pointed out by Austen, this species resembles *C. schultzei* very closely. The difference most easily appreciated is that found in the arrangement of the pale areas in the region of the fork of Cu. Here, between the branches of Cu, there are two pale areas in *C. kingi*, a rounded spot near the posterior margin of the wing, and an elongated or teardrop-shaped spot anterior to it and lying up against Cu 1, whereas in a typical specimen of *C. schultzei* there is only a single pale spot between the branches of Cu, and that is elongated or somewhat reniform in shape. *C. schultzei* is well known to be a variable species, and *C. kingi* should probably be regarded as only a variety of it. The hypopygium of the male is apparently indistinguishable from that of *C. schultzei*.

Culicoides sp. ? *langeroni* Kieff.

Bir el Abd, 7.vii.1941, 2 ♀, "In tents in morning" (Dr. W. H. R. Lumsden).

These insects, which have no very characteristic features, cannot be identified definitely until males are available for examination. They may, however, be the same as *C. langeroni*, a species found in Tunisia and described by Kieffer (1921), or *C. arenarius*, a species found in British Somaliland and described by Edwards (1922), which may be the same as *C. langeroni*.

They are small, pale yellowish-brown insects with unadorned thorax and wings. Length of wing about 1 mm. Palpi pale, brownish, third segment greatly inflated, with a large shallow pit in anterior half; lengths of last three segments about 14, 5, and 8 units respectively. Antennae pale brown, segments 4-10 oval, in one specimen measuring from 7 by 6 to 8 by 5 units; 11-14 vasiform, sub-equal, about 10 by 7 (max.) units; 15 longer, about 20 by 6 (max.) units, tapering distally, without stylet. The combined lengths of segments 11-15, 4-10, and 3-10 in one specimen 65, 52, and 65 units respectively. Thorax yellowish-brown, unadorned, with sparse and rather dark brown hairs. Wings unadorned, venation and distribution of macrotrichia much as in *C. inornatipennis*. Legs pale, brownish; T.R. about 2. Abdomen pale, brownish; spermathecae 2, well chitinised, oval, sub-equal, about 41 μ by 26 μ , the duct chitinised for a short distance, about 11 μ , at its commencement.

A brief reference may be made here to another specimen, a single female taken by Dr. W. H. R. Lumsden at Jiarabûb in Libya on 17th August, 1941, which also cannot be identified until males are available for examination. It bears a general resemblance to the specimens from Bir el Abd but is larger, length of wing about 1.2 mm., and although light brown in colour it is somewhat darker, more amber-brown. Other points that may or may not be characteristic are that the palpal pit is deeper, and that the terminal segments of the antenna are slightly longer. Dr. Lumsden noted that this species was "troublesome in early morning, 05.30-06.00 hrs., in redoubt."

Culicoides pallidipennis C., I. & M.

Moascar: 15-19.ii.1942, 1 ♀, "on window"; 1-6.iii.1942, 1 ♂, "on window"; 7-14.iii.1942, 1 ♀, "on window"; 15-31.iii.1942, 1 ♂, 3 ♀, "on

window"; iii.1942, 2 ♂, 1 ♀, "in bungalow" (Dr. O. Theodor); iv.1942, 4 ♂, 14 ♀, "on windows"; iv.1942, 2 ♀, "on windows" (Dr. S. H. Segerman); and v.1942, 1 ♂, "on window." Also Sarafand, Palestine, ix.1941, 1 ♀.

These specimens agree well with West African examples, but are more clearly marked, their wings being indeed often conspicuously adorned. The hypopygium of the males has one peculiarity, the ventral wall of the aedeagus is chitinated and brownish in colour almost to its basal quarter. In all other respects the parts of the hypopygium are as shown in the figures given by Carter, Ingram, and Macfie (1920). The species resembles rather closely *C. obsoletus* Mg. but is smaller, length of wing 1.2 mm. or less. The hypopygium, however, is very different (see Edwards, 1939), and resembles more nearly that of *C. chiopterus* Mg.

Cuticoides pulicaris (L.).

Bir el Abd, 7-8.vii.1942, 1 ♂, 10 ♀, "In tents in morning" (Dr. W. H. R. Lumsden), and 3.v.1942, 1 ♀, "biting" (Dr. C. Wollaston). Moascar, 15-31.iii.1942, 1 ♀, "on window."

Most of these specimens would probably have been identified by Edwards (1939) as *C. halophilus* K. both on account of the markings on the wings and because of the characters of the hypopygium, but others resemble more closely rather pale forms of the *punctatus* Mg. variety of *C. pulicaris*. *C. pulicaris* is a very variable species, and for this reason I have preferred to refer them all to this species. They are presumably the same as *C. newsteadi* Aust.

Culicoides puncticollis Becker.

Spinney Wood, Ismailia, 24.vii.1941, 15 ♂, 9 ♀. Reared from larvae found in a small collection of brown, discoloured water at the bottom of a shallow "slit trench" dug in the sand. With them were numerous larvae of *Anopheles multicolor*. When the midges emerged they did so in the evening, at about 6 p.m. Also, Moascar, iii.1942, 1 ♀, "on window" (Dr. S. H. Segerman), and Nifisha, near Ismailia, 11.iv.1942, 2 ♀, "Biting" (Dr. O. Theodor).

The specimens show a considerable range of variation, some being much darker than others, but none being very dark. The spots at the bases of the hairs on the mesonotum are in most specimens conspicuous, but in others they are more or less obscured by the deeper colour of the antero-posterior bands. The latter forms are probably the same as those from Alexandria examined by Kieffer (1925) and considered by him to be a variety of *C. donatieni*. The wing markings in the majority are much less distinct than they are shown to be in Edwards' (1939) figure, and the macrotrichia are more scanty, being confined almost to the tips of the wings beyond the level of the end of the costa, and absent from, or rare in, the anal cell and the area enclosed between the branches of Cu. Length of wing 1.4-2.0 mm., in the majority well under 1.5 mm. Legs quite pale brown.

It has been suggested by Edwards (1939) that *C. riethi* and *C. puncticollis* may be merely northern and southern forms of the same species. In support of this view, and notwithstanding the great dissimilarity in size and general appearance between the specimens and examples of *C. riethi* in the collection of the British Museum which I have examined, it may be noted that in the insects from Ismailia the single spermatheca is like that figured by Edwards as characteristic of *C. riethi*, and that the hypopygium is similar. The spermatheca is oval, rather longer than the example figured by Edwards, measures

about $82\ \mu$ by $44\ \mu$ (max.), and has a wide opening towards the duct. It is only moderately well chitinated. The hypopygium is similar to that of *C. riethi* with which I have compared it. It is, however, much less highly chitinated, and in consequence the excavation in the ninth sternite is difficult to detect although it is actually present but is narrower, more like a notch, than shown in Edwards' figure which seems to have been drawn from a specimen in which it was exceptionally wide.

On the front are two small projections as noted by Kieffer in *C. donatieni*, a species which Edwards includes as one of the synonyms of *C. puncticollis*. These projections are not peculiar to this species but are found also in other allied species.

Larva of the usual *Culicoides* type, vermiform, aquatic, very active. Length 5-6 mm. Head rather feebly chitinated, yellowish. Mandibles moderately well chitinated, pointed, without any definite barb. Hypopharyngeal sclerite armed on each side posteriorly with a comb of about 10 small teeth, none of which is especially well developed, but which increase slightly in size towards the middle line. Body cylindrical, whitish, with sparse and quite inconspicuous hairs.

Pupa with cephalo-thorax dark brown, darker than abdomen. Length about 3 mm. Respiratory trumpets raised on rather long pedicles, length about 0.3 mm. Distal ends and often middle as well more or less darkened, the latter portion irregularly annulated. Stem with two or three knob-like projections at varying points. Main tracheal trunk terminating distally in an irregular fan-like arrangement of about 12-17 short, blunt processes. Cephalothorax with tubercles arranged similarly to those of *C. accraensis*. Last segment of abdomen with only basal quarter spiculate, its lateral processes widely divergent in both sexes, projecting almost at right angles to long axis of body, with pointed ends which are often infuscated.

Culicoides schultzei (End.).

Bir el Abd, 7.vii.1941, 1 ♂, 2 ♀, "In tents in morning" (Dr. W. H. R. Lumsden). Moascar: viii.1941, 2 ♀, "On windows of laboratory"; iii.1942, 2 ♂, 2 ♀, "On windows of laboratory"; iii.1942, 1 ♂, 4 ♀, "In bungalow" (Dr. O. Theodor and Dr. S. H. Segerman); iv.1942, 4 ♂, "On windows of laboratory"; iv.1942, 1 ♂, 2 ♀, "In bungalow" (Dr. O. Theodor and Dr. S. H. Segerman).

The specimens from Bir el Abd, and some of those from Moascar also, differ considerably from typical examples of *C. schultzei*. The thorax, for example, is not clearly adorned with dark spots but bears the usual antero-posterior bands which are dark brown and so obscure the spots more or less completely; and the wings bear a group of three pale spots (not two) just beyond the end of the costa, the third being a small but distinct spot situated in the distal part of the area immediately posterior to R 4 + 5 which is usually marked only by a general pallor (fig. 5). *C. schultzei*, however, is known to be a very variable species in size, in colour, and in the details of the adornment of the thorax and wings, and there is no reason to consider the specimens from Bir el Abd as especially remarkable. I have examined specimens from Malaya (*C. oxystoma* K.) which resemble them in every respect.

Culicoides similis C., I. & M.

Moascar: 22-26.ii.1942, 2 ♂, "on windows"; 1-6.iii.1942, 3 ♂, 1 ♀, "on windows"; iv.1942, 1 ♂, 2 ♀, "on windows"; iv.1942, 10 ♂, 14 ♀, "in

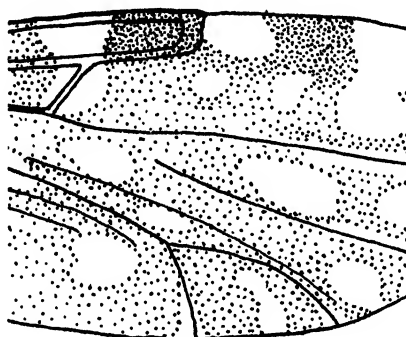
bungalow" (*Dr. O. Theodor*); and iv.1942, 2 ♀, "on window" (*Dr. S. H. Segerman*).

The thorax in a few of these specimens is quite a light brown colour.

Culicoides vitreipennis Austen.

Bir el Abd, 7-8.vii.1941, 4 ♂, 3 ♀, "In tents in morning" (*Dr. W. H. R. Lumsden*); and 3.v.1942, 1 ♀, "biting" (*Dr. C. Wollaston*). Moascar, iv.1942, 1 ♂, "in bungalow" (*Dr. O. Theodor*).

These specimens should probably be assigned to the same species as the single female taken by Austen in his tent near Jerisheh, in Palestine, which he described (1921) and named *C. vitreipennis*. This species Edwards (1939) considered might well be the same as *C. albihalter* K., and he quotes an opinion of Goetghebuer that *C. albihalter* might be an earlier name for *C. heliophilus* Edw. All four species are clearly similar, and with them must be associated *C. inornatipennis* C., I. & M. and *C. judaeae* Macfie. Owing to war conditions



5

FIG. 5.—*Culicoides schultzei* (End.): part of wing to show adornment.

I have been unable to re-examine the types of *C. judaeae* to compare them with the insects from Bir el Abd, but I believe there are definite differences, e.g. in size, and in the form of the aedeagus.

All but one of the specimens from Bir el Abd were preserved in spirit and are therefore not easy to compare with Austen's description of *C. vitreipennis* which is based entirely on the colour characters of the dried insect. The following details regarding them may therefore be found useful.

Head dark brown. *Palpi* brown, similar to those of *C. judaeae*. *Antennae* brown, similar to those of *C. judaeae*: combined lengths of segments 4-12 and 13-15 of male about 76 and 68 units respectively, and of segments 11-15, 4-10, and 3-10 of female about 78, 62, and 73 units respectively. *Thorax* almost uniformly darkish brown. *Scutellum* paler, more yellowish; bearing the usual 3 or 4 bristles and a few small hairs (about 8 to 12 in female). In *C. vitreipennis*, it should be noted, the scutellum is described as "agreeing in coloration with remainder of dorsum". *Wings* unadorned, but when viewed with a hand lens showing a small clear area just beyond the end of the costa, with a slightly infuscated area on each side of it caused partly by the distribution of the macrotrichia, and partly by infuscation of the wing membrane, but not due to any difference in the colour of the macrotrichia. The hairs on the radial cells are pale in *C. vitreipennis*, like those on the rest of the wing (Edwards 1939), whereas in *C. heliophilus* they are largely black although they do not form an obvious black spot as in *C. stigma*. Length of wing

about 1.25 mm., that is about the same as in *C. vitreipennis* or *C. heliophilus*, and longer than in *C. judaeae* or *C. inornatipennis*. Distribution of macrotrichia and venation as in *C. judaeae*. Halteres with pale knobs. Legs brown, much as in *C. judaeae*. T.R. 2 or slightly less; tarsal segment 5 slightly longer than 4. Abdomen brown, paler than thorax. Spermathecae 2, well chitinised, oval rather than sub-spherical, unequal, the duct not at all chitinised. Hypopygium darker brown than rest of abdomen, much as in *C. heliophilus*. Ninth tergite cleft, with posterior processes longer than those of *C. judaeae*, about the same length as those of *C. heliophilus*, but not so long as in *C. inornatipennis*. Ninth sternite widely but not very deeply excavated, as in either *C. judaeae* or *C. heliophilus*. Ventral root of side-piece (coxite) inconspicuous, not foot-shaped. Harpes much as in *C. judaeae*, but tips sometimes curved as in *C. heliophilus*. Aedeagus Y-shaped, as in *C. heliophilus* (see Edwards, 1939), but with the stem portion rather narrower and longer. Membrane joining aedeagus to ninth sternite not spiculate or with only a few spicules at base.

The single specimen from Moascar, a male, agrees in most of its characters with the others but is rather larger, length of wing about 1.45 mm., and the combined lengths of segments 4-12 and 13-15 of its antennae are about equal, namely 88-89 units. The hypopygium apparently does not differ in any important respect from that of the males from Bir el Abd excepting in having more numerous spicules on the membrane joining the aedeagus to the ninth sternite.

Alluaudomyia melanosticta (I. & M.).

Moascar, 1-6.iii.1942, 1 ♂, and 7-14.iii.1942, 1 ♀, "On windows of laboratory in evening."

The male agrees well with the description of the original, Gold Coast, specimen, and has a similar and apparently indistinguishable hypopygium. As I have noted elsewhere (1924), the wings of the female are adorned with more numerous black or blackish markings than those of the male. The smaller markings are probably somewhat variable. In both the specimens from Moascar there are two small blackish spots between the branches of Cu. It seems probable that *A. nilogenes* (K.) should be regarded as a synonym of *A. melanosticta* (I. & M.).

BOOK NOTICE.

Insects of Guam. I. (*Bull. Bernice P. Bishop Mus.* 172 : 1-218, 10 pls., 1 map, text illust.) 1942.

In 1936 an entomological survey of Guam was carried out under the auspices of the Hawaiian Sugar Planters' Association to study insects of economic importance associated with crops and those affecting animals and man.

This first report includes papers by specialists on Odonata, Thysanoptera, Homoptera, Neuroptera, Lepidoptera, Coleoptera, Strepsiptera, Hymenoptera and Diptera.

It is expected that a second volume will be required for the publication of the remaining papers not yet ready for the press.

Over one-half of the present volume is devoted to the Coleoptera, and the longest single paper is that on the CURCULIONIDAE in which no less than 33 of the 49 species studied are described as new.

NOTES ON THE GENERA *AGRIOGOMPHUS* SELYS AND *ISCHNOGOMPHUS* WILLIAMSON WITH THE DESCRIPTION OF THE MALE OF *AGRIOGOMPHUS SYLVICOLA* SELYS (ODONATA)

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

I AM indebted to Mr. W. D. Hincks of Leeds for the opportunity of studying and reporting on one of the most interesting dragonflies that has been discovered for some years. The specimen is a male which Mr. Hincks has correctly determined as an *Agriogomphus*, and is of first importance as it now supplies us with the male generic characters which have remained unknown since the creation of the genus by Selys in 1869. Williamson, in 1918, described the male of an *Agriogomphus*, but he failed to recognise it as such and made it the genotype of a new genus *Ischnogomphus*; his definition included some characters which are of specific rather than generic value and these are the only ones which separate *Ischnogomphus* from *Agriogomphus*.

HISTORICAL.

1869. Selys described the genus *Agriogomphus* with genotype *Agriogomphus sylvicola* sp. n. The latter was described from two females, the habitats of which the author gave as Ega and S. Paulo, Upper Amazon. The type, now in the Brussels Museum, bears a label "St Paulo", indicating the village some 400 miles up-river from Ega, where Bates, who took the specimens, spent some five months collecting. (The full name of this locality is São Paulo de Olivença.) The great distance separating Ega from S. Paulo argues a wide distribution for *A. sylvicola* and it is quite possible that the species may be found on most tributaries of the Amazon and right up to their sources in the western watershed, otherwise it would be difficult to account for the presence of a second species in Colombia on the western side of the watershed, and another habitat in Peru.
1873. Under the description of *Cyanogomphus*, Selys emended and added to the description of the genus *Agriogomphus*.
1903. Needham published a figure of the wings of a supposed *Agriogomphus*. His material was a shrivelled teneral male specimen of which only the wings were preserved. It was later shown by Williamson to be an *Archaeogomphus*.
1909. Ris published a wing-figure of a supposed *Agriogomphus* but gave no description of the species.
1913. Ris now published the description of the species which he named *Agriogomphus infans*, his material being two specimens only, both belonging to the female sex.
1918. Williamson published the description of a third supposed *Agriogomphus*—*A. hamatus*, from a number of both sexes; in the same paper he described a fourth, from a female, but did not name it.
1919. Williamson created the new genus *Archaeogomphus* with genotype *Agriogomphus hamatus* Will. In this paper he showed that both Needham's wing-figure and Ris's *A. infans* were to be referred to the new genus. In the interval between his 1918 and 1919 papers he had received a photograph from Brussels Museum of the wings of the type of *Agrio-*

gomphus sylvicola, and from a comparison of this with the wing venation of *A. hamatus* it at once became evident that the two were not congeneric. The venation of *hamatus* was of a much more open character than that of *sylvicola*: its pterostigma covered only $2\frac{1}{2}$ cells as against double that number in *sylvicola*. Thus in 1919 the position of the genus *Agriogomphus* was right back to its starting-point in 1869; it was known only from the female sex and, from lack of knowledge of the male characters, the definition of the genus remained incomplete. Mr. Hinck's specimen now enables me to fill in this gap.

1919. Williamson described a new genus *Ischnogomphus* with *Ischnogomphus jessei* sp. n. as genotype. His material was a single male from near Puerto Berrio, Colombia. This locality lies nearly 800 miles from S. Paulo as the aeroplane flies but would not be more than 40 to 50 miles between the sources of the Amazon and Magdalena rivers. Thus if, as

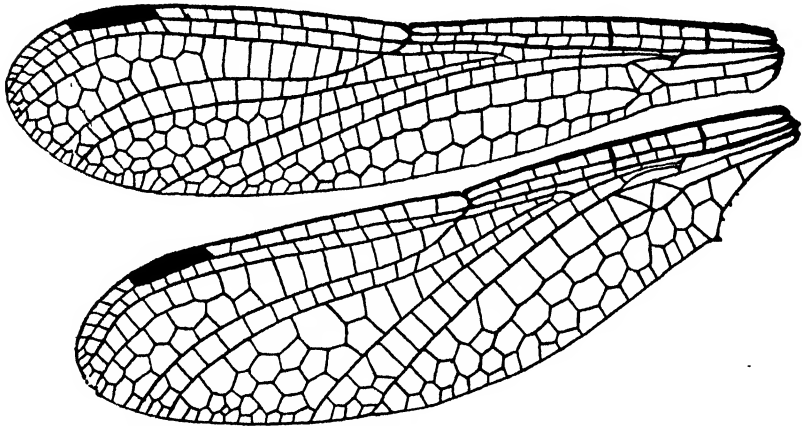


FIG. 1.—Wings of *Agriogomphus sylvicola* Selys, male, from the allotype.

I believe, *Ischnogomphus jessei* is a true *Agriogomphus*, then the Andean watershed offers no barrier to the spread of the species. Curiously enough, it does not appear to have occurred to Williamson that his specimen might be an *Agriogomphus*, for he says that it lies nearest *Cyanogomphus*, which is its closest ally.

Agriogomphus Selys (emend.).

Agriogomphus Selys, 1869, *Bull. Acad. Belg.* (2) 28 : 189.

Selys, 1873, *loc. cit.* (2) 35 : 754.

Williamson, 1918, *Occas. Pap. Mus. Zool. Michigan* 59 : 1.

Ischnogomphus Williamson, 1918, *loc. cit.* 52 : 6.

Agriogomphus Williamson, 1919, *loc. cit.* 63 : 2.

Male : Wings very narrow, apices rounded, base of hind-wing very narrow, forming a very obtuse angle with the posterior border of wing and with tornus reduced to a small projecting angle furnished with a small but conspicuous spine; anal-loop rudimentary, of 2 cells only; anal triangle and membrane absent; discoidal field in both fore- and hind-wings of 1 or 2 rows of cells to nearly as far as border of wing; 11-12 antenodals and 9 postnodals to fore-wings but these very irregular; a basal incomplete antenodal always present in all wings; the first (complete) and the fifth antenodals the primaries; sectors

of arculus strongly arched, converging immediately after origins, then separating slightly and running almost parallel for a short distance; *discoidal cells very variable*, the costal side in both fore- and hind-wings often markedly angulated (as in *Tetralthemis* etc.): that of fore-wing small, equilateral when normal: that of hind-wing, when normal, with basal side slightly shorter than the costal and distal sides. Pterostigma elongate, covering 4-5 cells, poorly braced.

Frons very depressed; occiput depressed; 3rd segment of antennae very short. Legs short, *tibiae four-sided*; femoral spines minute, very short and numerous. General colouring of body pale bluish-green with poorly contrasted markings on head and thorax.

Abdomen long and narrow, but slightly expanded analwards; genitalia on 2nd segment conspicuous by the very long and slim posterior hamules; anterior hamules short, ear-shaped; penis of *Gomphus* (*sens. strict.*) shape, flagellae short and curling. Anal appendages: superiors as long as segment 10, rather shortly conical, acuminate at apex and furnished below with a stout ventral spine, the apex of which curls out and then ends obtusely and directed somewhat anteriorwards: inferior appendage shorter, deeply divided into two parallel branches which embrace the two ventral spines of the superiors.

Female: resembles the male in most respects; leg armature similar; base of wings very narrow, that of hind-wing not marked off from the posterior border with which it forms a continuous strongly bevelled curve; vulvar scale short, deeply incised. Abdomen very long and slender, but slightly dilated analwards.

Habitat: Brazil, Peru and Colombia.

The genus *Ischnogomphus* agrees in every respect with *Agriogomphus*, shape of anal appendages, formation of genitalia and venation of wings save that, in *I. jessei*, there are 2 rows of discoidal cells in the wings instead of only 1, as in *A. sylvicola*: this I regard as a specific character similar to what is found in genera such as *Diplacina*, *Zygonyx*, *Lyriothemis*, *Macromidia* etc., so that it becomes necessary to modify the Selysian generic description in this respect.

Agriogomphus sylvicola Selys, 1869.

Agriogomphus sylvicola Selys, 1869, *Bull. Acad. Belg.* (2) 28: 190.

Agriogomphus sylvicola Williamson, 1918, *Occas. Pap. Mus. Zool. Michigan* 63: 8, pl. 1, f. 1. (wings).

Male. Abdomen 26.5 mm. Hind-wing 20 mm.

Head: labium greenish-grey, labrum and whole of face and frons dull bluish-green, vertex posterior to ocelli obscurely blackish-brown, occiput bluish-green as also behind eyes, but the swollen border here and a small but conspicuous spot below bordering the eyes black.

Prothorax olivaceous, immaculate; thorax bluish-green on dorsum with blackish-brown markings, and dull olivaceous on the sides and beneath. The black on dorsum enclosing two broad antehumeral stripes and two narrower humeral ones of the ground colour; the former are of the conventional *Gomphus* (*sens. strict.*) shape, very broad below where they meet over the dorsum at a point only, and tapering to an obtuse point above, which falls just short of the antealar sinus, which latter is framed in black. The humeral stripes are broad below, then very slim and very sinuous and again expand above in the form of a small knob which evidently represents the conventional upper humeral spot of *Gomphus*. Laterally are two long stripes which are poorly defined in their limits, one bordering the humeral suture, the other the first lateral suture. Legs dull olivaceous or bluish-green, with the knees and outer sides of the anterior tibiae and femora blackish-brown; spines black, forming a broad, thickly-set field of minute spines on the femora. (Attached to the middle right tibia of the unique specimen is the head and thorax of a small ant, its jaws clasp the limb tightly.)

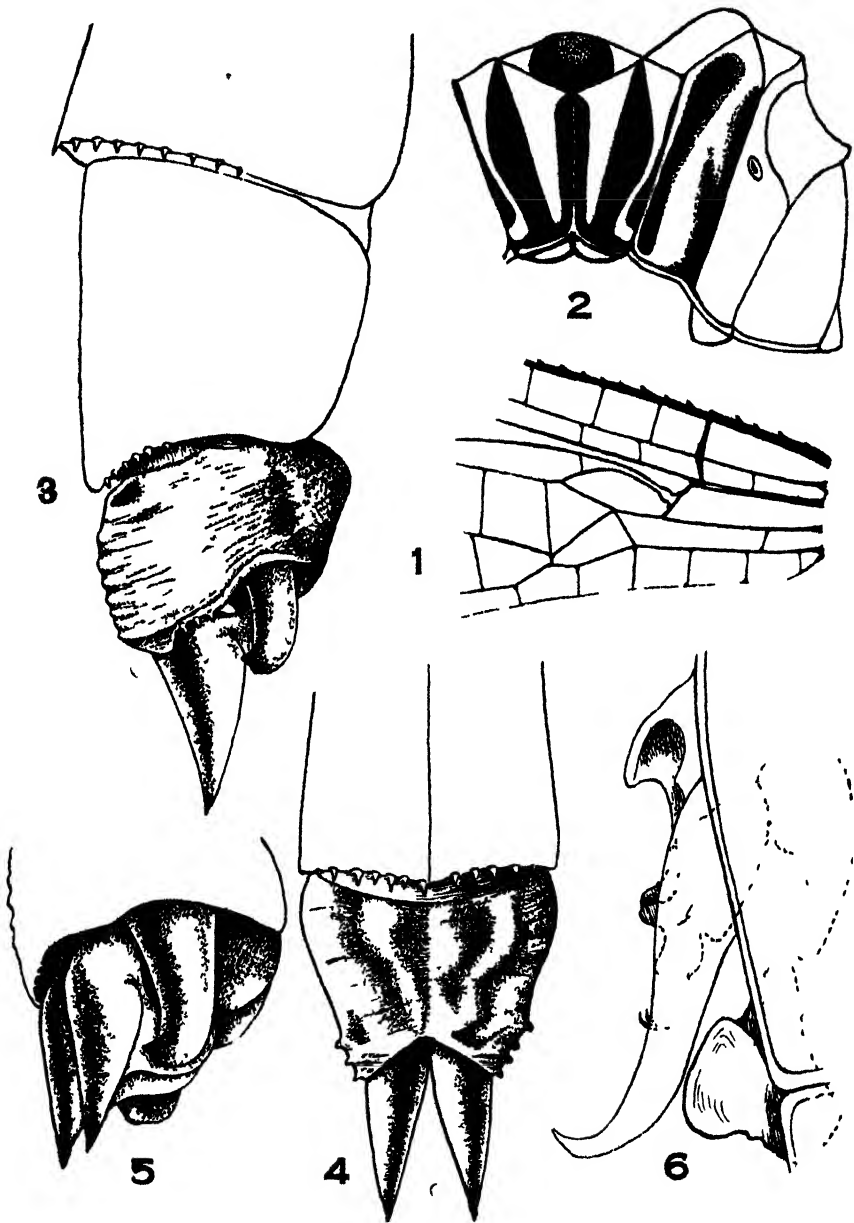


FIG. 2.—Details of *Agriogomphus sylvicola* Selys, male. 1, Base of fore-wing enlarged to show the formation of arculus and discoidal cell. 2, Markings of thorax. 3, Anal appendages and terminal segments of abdomen seen from the right side. 4, The same viewed from the dorsum. 5, Postero-lateral view of anal appendages. 6, Genitalia viewed from the left side

Wings hyaline; nodal index $\frac{9-11}{9-8} \frac{12-9}{9-9}$; discoidal cells of right fore-wing and left hind-wing (of the specimen under description) have the costal sides markedly angulated, the other two cells are normal triangles; pterostigma black, braced in some wings, in others not at all, covering 5 cells. Abdomen black: segments 1 and 2 olivaceous green, the transverse carina of the latter finely black; segments 3 and 4 with the mid-dorsal carina finely pale olivaceous green nearly to apical ends of segments and with the sides basal to the transverse carinae pale bluish-white; segments 5 and 6 have the whole of the basal area pale bluish-white save for a small ill-defined blackish-brown mark; segment 7 with its basal half conspicuously bluish-white; 8 to 10 black, the former segment prolonged apically at its dorsal carina. Anal appendages: almost exactly similar to those described for *Ischnogomphus jessei* Will. The superiors palest yellow, as long as segment 10, the ventral tooth considerably more robust than in *jessei*, its apex obtuse. Inferior appendage blackish, projecting straight posteriorwards, apex very obtuse and with a short upper subapical spine. Genitalia: anterior hamules short, ear-shaped: posterior hamules very long and sinuous, both pairs exactly similar to those of *I. jessei*.

Habitat: BRAZIL: Ega and S. Paulo (de Olivença); PERU: Katzenbach (*Mishuyacu*), 15 km. v. Iquitos, 10.iii.31. This species agrees so closely to the somewhat meagre description of the type of *Agriogomphus sylvicola*, that I have little hesitation in regarding it as the opposite sex of that species, although it comes from a far-removed locality. A distance of 400 miles separated the localities in which the two females were taken and Williamson's species *jessei* was taken in Colombia on the western side of the watershed, so that the argument of widely separated localities bears no weight. *A. sylvicola* Selys differs from *A. jessei* (Williamson) by the complete antehumeral stripe and by the single row of discoidal cells in both fore- and hind-wings. Two females in the Selysian collection, Brussels Museum, one of which is the *type*: allotype male in my own collection at present but will eventually, together with the whole of the collection, be deposited in the British Museum.

Mr. J. E. Roberts, who has seen this supposed allotype male of *Agriogomphus sylvicola* from Peru, expresses his opinion that it would not be safe to associate it with the female *A. sylvicola* in view of the differences of locality, and suggests that a name should be given to it which may be confirmed in the future if the male be found to belong to a new species: in adopting his advice, I suggest the name *Agriogomphus aquicola*.

Agriogomphus jessei (Williamson), 1918.

Ischnogomphus jessei Will. 1918, *Orcas. Pap. Mus. Zool. Michigan* 52: 10.

Male. Abdomen 32.5 mm. Hind-wing 24 mm.

This species differs from *A. sylvicola* Selys by its larger size, by the presence of 2 rows of discoidal cells in both fore- and hind-wings, instead of only a single row, and by the different character of the thoracic markings. It resembles *sylvicola* by its general dull inconspicuous bluish-green colouring, by its anal appendages and genitalia, by the 4-sided tibiae and, with the exception of the discoidal field, by its venation generally. An increase in the melanism of *jessei* such as might be expected to develop in very adult age would result in the thoracic markings closely resembling those of *sylvicola*, so that it is evident that the two species are very closely related and it is even possible that they may be merely races of one species.

I take this opportunity of publishing a note on another species of GOMPHIDAE, viz. *Merogomphus longistigma tamaracherriensis* Fraser. Mr. D. E.

Kimmins, who has examined a specimen collected in Tinnevely, S. India, by Mr. Henry, expresses his opinion that it is a good species, and points out that it not only differs from *M. longistigma* (Fraser) in its colour and markings but also by the shape of the anal appendages which taper rather evenly from base to apex, whereas in *longistigma* these same appendages are greatly swollen at the base and narrow abruptly at the junction of the basal and middle thirds. This form should be known in future as *Merogomphus tamaracherriensis* Fraser.

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FRASER, F. C., 1934, *Fauna British India, Odonata* 2 : 313.

NEW PALAEARCTIC FUNGUS-GNATS (DIPTERA, FUNGIVORIDAE)

By A. A. STACKELBERG.

Hadroneura kamtshatica sp. n.

Hypopygium moderately short and broad, with well-developed cerci, distal margin of which ornamented with a row of dense bristles; style with a large basal tooth-like process.

Male. Head black, grey pollinose, with yellow hairs. Palpi and proboscis blackish-brown. Antennae moderately long, black; second basal joint brownish-yellow. Thorax black; mesonotum greyish pollinose, not shining, with 4 moderately broad black longitudinal stripes. Mesonotal bristles yellow. Pleura and postscutellum greyish pollinose, not shining; pleurotergite with dense, but short yellowish hairs. Coxae and legs dark yellow; trochanters brown; tarsi blackish-brown. Tibial spurs yellow. Front tibiae about as long as four basal joints of front tarsi taken together. Claws normal, with a small tooth-like process at base; empodium distinctly developed. Wings brownish tinged; wing veins of the front half of wing rather thick. Wing-venation as in *Hadroneura palmeni* Lundstr., but anal vein slightly longer. Abdomen black, moderately shining, with yellowish hairs. Hypopygium (figs. 1, 2) broad; coxite large and robust; style moderately long, with a tooth-like process at base; cerci large with a comb-like row of long and dense flattened bristles on distal margin. Wing about 4.5 mm.

Distribution.—Kamchatka, Kamchatka river near Kljutshevsk, 8.vi.1909, 1 ♂—type (*Sapozhnikov*). Type in the Collection of the Zoological Institute, Academy of Sciences, Leningrad.

Boletina kowarzi sp. n.

Species of medium size. Pleurotergite hairy. Mesonotal bristles dark brown. Similar to *Boletina dubia* Mg. and *Boletina villosa* (Landr.) Edw., but differs in hypopygium.

Male. Head black, slightly shining, with dark brown hairs. Palpi blackish-brown. Antennae moderately short, black. Thorax black. Mesonotum black, polished, without longitudinal stripes. Acrostichal and dorsocentral bristles dark brown. Pleura and postscutellum polished black, slightly grey pollinose. Coxae and legs dark yellow. Tarsi dark (brown to black). Tibial spurs dark brown. Mid- and hind-tarsal claws of ♂ equal, with a small basal tooth (front tarsi of type absent). Wings slightly brownish tinged; costal vein reaches to about $\frac{1}{2}$ of the distance from r_5 to m_1 ; sc ending above base of r_5 ; sc_2 absent; stem of m -fork about as long as rm ; basis of cubital fork at about level of m -fork; an terminating at about level of basal third of cu -fork. Halteres yellowish. Abdomen black, polished. Hypopygium (figs. 3, 4) moderately large and long, black; style forked; medial arm of style shorter than the lateral one, without terminal appendage. Wing about 4 mm.

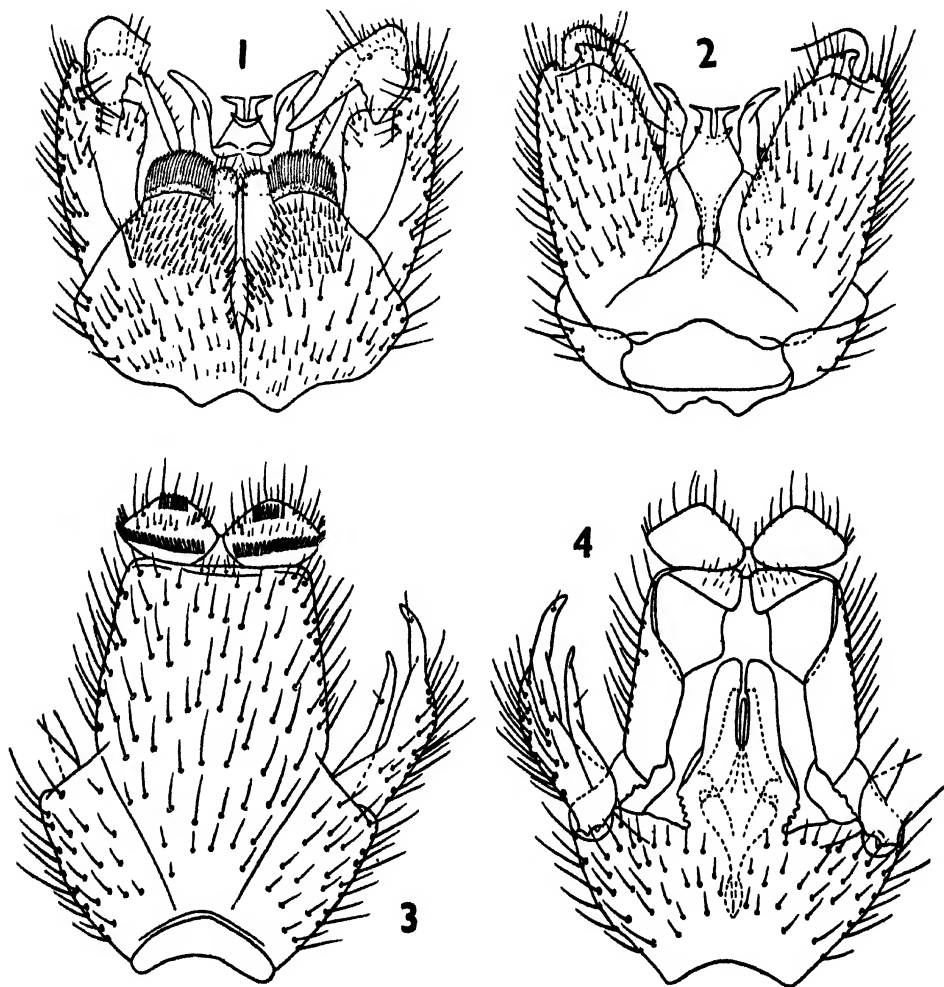
Distribution.—Germany. Described from 1 ♂ (type) from Bad Liebenstein, Thuringia, 28.vi.1877 (*Fr. Kowarz*). Type in the Collection of the Zoological Institute, Academy of Sciences, Leningrad.

Boletina verticillata (Lackschewitz *in litt.*) sp. n.

Small black species with very long cerci and broad knife-like style. Pleurotergite bare.

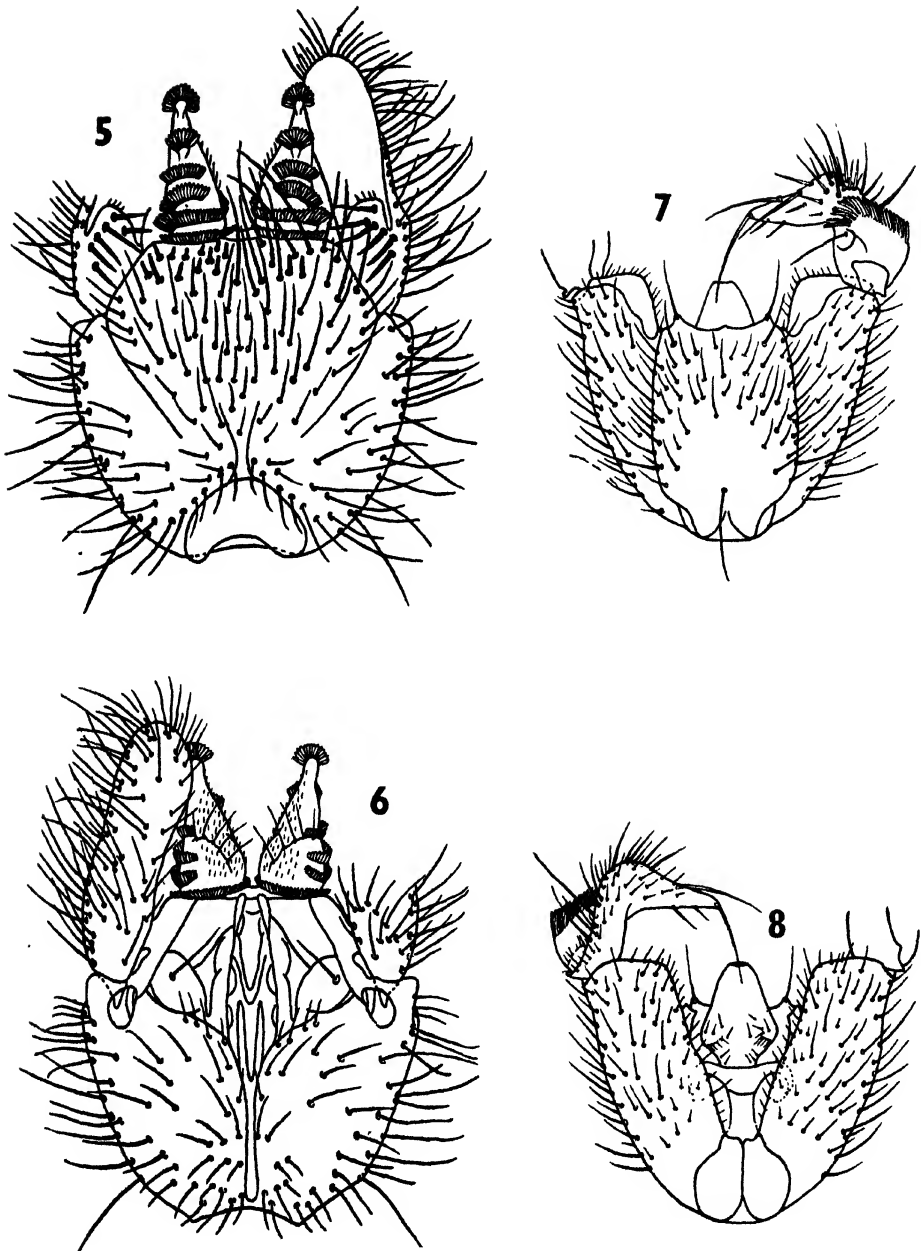
Male. Head black, slightly greyish pollinose. Palpi yellow. Antennae long, black; first flagellar joint yellow at base. Thorax black; mesonotum polished black; sides of

mesonotum and humeral tubercle light grey pollinose. Pleura and postscutellum greyish pollinose; pleurotergite bare. Mesonotal bristles light yellow. Coxae and legs yellow; basal half of hind coxae dark, blackish-grey. Tibial spurs yellow. Tarsi blackish-brown. The first joint of front tarsi slightly shorter than tibiae; the fourth joint of front tarsi $1\frac{1}{2}$ times as long as the fifth. Tarsal claws of the male small, not broadened, symmetrical,



FIGS. 1-4.—1, *Hadroneura kamtschatica* sp. n. ♂. Hypopygium from above; 2, *Hadroneura kamtschatica* sp. n. ♂. Hypopygium from below; 3, *Boletina kowarzi* sp. n. ♂. Hypopygium from above; 4, *Boletina kowarzi* sp. n. ♂. Hypopygium from below.

with a small basal tooth. Wings clear, slightly yellowish at base. Costal vein reaches to about $\frac{1}{2}$ of the distance from r_5 to m_1 ; sc ending above base of r_5 ; sc_2 absent; stem of m -fork about as long as rm ; basis of cubital fork slightly behind middle of m -fork-stem; cubital fork-stem with short bristles; an terminating at about level of basal third of cubital fork. Halteres whitish. Abdomen black, polished. Hypopygium (figs. 5, 6)



FIGS. 5-8.—5, *Boletina verticillata* sp. n. ♂. Hypopygium from above; 6, *Boletina verticillata* sp. n. ♂. Hypopygium from below; 7, *Sciophila fridolini* sp. n. ♂. Hypopygium from above; 8, *Sciophila fridolini* sp. n. ♂. Hypopygium from below.

large and long; cerci very long, about 3 times as long as broad at base, with about 5 transverse rows of flattened bristles; style broad, knife-like, long, with truncate tip, on the lateral margin with moderately long bristles. Wing about 3 mm.

Distribution.—N.W. Siberia, between Small Ural (Malyj Ural) and Lake Vartsha-ty, distr. Obdorsk, 28.viii.1925, 1 ♂—type (*V. Y. Fridolin*). Type in the Collection of the Zoological Institute, Academy of Sciences, Leningrad.

***Sciophila fridolini* sp. n.**

Similar to *Sciophila plurisetosa* Edw., but differs in hypopygium.

Male. Head black. Palpi blackish. Antennae black, with yellowish-brown basal joints; flagellar joints as long as broad or slightly longer than broad. Thorax black; mesonotum polished black; pleura sometimes yellowish-brown. Coxae and legs dark

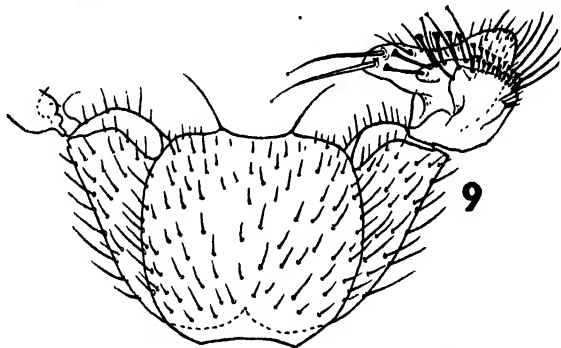


FIG. 9.—*Sciophila vakulenkoi* sp. n. ♂. Hypopygium from above.

yellow; tarsi brown. Wings clear, slightly yellowish at base; wing membrane covered with micro- and macrotrichia; cu_{1a} normal, not interrupted. Abdomen black. Hypopygium (figs. 7, 8) below with a very large triangular incision, reaching to about basal fourth of hypopygium; ventral lamella of style long, triangular, with acute medial end, bristly haired; 9th tergite with slightly concave distal margin. Wing about 3 mm.

Distribution.—Kola Peninsula, Chibinā, 1 ♂—type (*V. Y. Fridolin*). Type in the Collection of the Zoological Institute, Academy of Sciences, Leningrad.

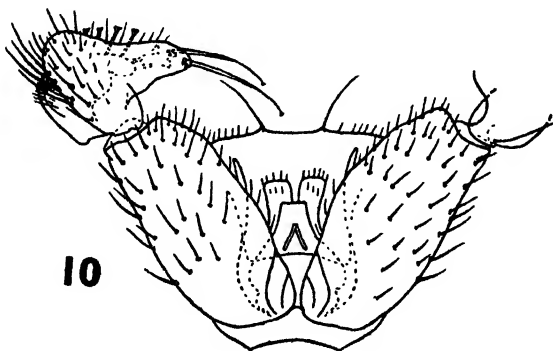


FIG. 10.—*Sciophila vakulenkoi* sp. n. ♂. Hypopygium from below.

Sciophila vakulenki sp. n.

Similar to *Sciophila fuliginosa* (Holmgren) Lundstrom, but differs by longer medial fork-stem, which is as long as *rm* or even longer, by yellowish wing-veins and differences in the hypopygium.

Male. Head black. Palpi and antennae uniformly black. Thorax black, slightly polished. Abdomen black. Thorax and abdomen covered with yellow hairs. Coxae black, slightly greyish pollinose. Femora brown; tibiae yellowish-brown; tarsi blackish-brown. First joint of front tarsi about as long as front tibia. Wings slightly brownish tinged, with micro- and macrotrichia. Wing-veins, especially costal vein, yellowish; *m*-fork-stem as long as *rm* or slightly longer. Hypopygium (figs. 9, 10) broad and short; style with moderately short ventral lobe, but without lateral tuft; 9th tergite quadratic, with nearly straight distal margin. Wing about 4 mm.

Distribution.—Novaja Zemlja, Southern Isle, 1925 (*Vakulenko*). Type in the Collection of the Zoological Institute, Academy of Sciences, Leningrad.

A NEW GENERIC NAME IN THE DYTISCIDAE (COLEOPTERA)

By J. BALFOUR-BROWNE, M.A., F.R.E.S.

Neoscutopterus nom. n.

Scutopterus Sharp (1882, *On Ag. Carn. Col. Sci. Trans. R. Dublin Soc.* 2: Ser. 2: 606) nec Aubé, Crotch *partim*.

Crotch cites as genotype of *Scutopterus* the species *coriaceus* Cast. which was the sole species described in the genus *Meladema* created by Castelnau (1835, *Etudes Ent.* : 95) and is therefore the genotype of *Meladema* and in consequence *Scutopterus* must fall as a synonym of *Meladema*.

Aubé (1836, *Icon. Col.* 5: 94) mentions *Scutopterus* after *Meladema* as a division of the genus *Colymbetes* in the sense of a subgenus. This would appear to constitute the first valid use of the name, and two species are included, *coriaceus* and *pustulatus* (Rossi). The name appears therefore to have been published as a synonym in the first valid publication, being ascribed to Eschscholtz. Sturm (1843, *Cat. Käf.-Samml.* : 39) uses *Scutopterus* as a valid genus with "Colymbetes Aubé non Clairv." as a synonym and includes both *coriaceus* and *pustulatus* and a third species, *anthracinus*, which is said to be from Mexico, but has never been described. In the event of an objection to the claim that Aubé's use of the name constitutes publication, Sturm's date of publication precedes that of Crotch and is indubitably valid as, though no diagnosis or description accompanies the use of the name, both species *coriaceus* and *pustulatus* are recognisable.

Under *Meladema* in Zimmermann (1920, *Junk, Coleopt. Cat.*, 71: 214) a synonym is given:—

Scutopterus Lacord. (1835, *Fn. Ent. Paris* 1: 308).—Gemm. & Har. (1868, *Cat. Col.* 2: 447).—J. Lec. & Horn (1883, *Classif. Col. North America* : 66).

In fact the reference to Lacordaire is to *Cymatopterus* and it is unfortunate that this reference has been repeated in Neave (1940, *Nomencl. Zool.* 4: 159). The Leconte & Horn use of the name is undoubtedly following Crotch and is therefore only an *ex parte* reference.

Sharp (1882, *On Ag. Carn. Col.* : 606) restricts the use of the name to only the two American species, *angustus* (Lec.) and *horni* Crotch, and it is in this sense that the name has since been used, but, as I have shown, *Scutopterus* Crotch is a synonym of *Meladema* and the two American species are therefore without a valid generic name and for them I propose **Neoscutopterus** nom. n., the diagnosis of the genus being that given by Sharp (*loc. cit.*). No genotype appears to have been designated, and accordingly I hereby select as genotype *Agabus angustus* J. Leconte (1850).

NEW OR LITTLE-KNOWN SPECIES OF EXOTIC TIPULIDAE (DIPTERA)

By Professor Charles P. ALEXANDER, F.R.E.S.

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IN the present series of papers I plan to publish the descriptions of new crane-flies and to supply records of distribution in the cases of rare and insufficiently-known species. In this paper I am considering certain forms from southern and south-western China (Kwangtung, Yunnan, Szechwan) that have been received in recent years. Most of these species were secured by Mr. J. Linsley Gressitt and Mr. F. K. To in northern Kwangtung in the spring of 1940, particularly in the Kau-lin San, Lien-p'ing District, and at various stations while en route to these mountains. Further material was included in the very extensive Franck collections from Mount Omei, Szechwan, whence very many new species have been described by the writer in recent years (*Philippine Journal of Science*, 1931-1941). One further unusually interesting species of *Tipula* was sent to me for determination by Dr. Alan Stone, in charge of the Diptera in the United States National Museum. I am very indebted to all of the entomologists named for their friendly co-operation. Except where indicated to the contrary, the types of the novelties will be returned to the Zoological Museum, Lingnan University, Canton, when conditions permit.

Dolichopeza (Trichodolichopeza) sparsihirta sp. n.

General coloration of mesonotum brown, the praescutal stripes three, poorly indicated; pleura yellow, variegated with darker on the propleura, sternopleurite and meron; femora obscure brownish-yellow, the tips narrowly infuscated; tibiae pale brown, the tips narrowly darkened, the bases about equally whitened; tarsi white; wings before cord with a weak brownish tinge, the outer radial cells strongly darkened; stigma oval, dark brown, preceded and followed by restricted white areas; sparse macrotrichia in outer ends of cells R_3 to 2nd M_2 , inclusive; cell M_1 small, about one-third its petiole; abdomen brownish-black, the tergites narrowly ringed with light yellowish-grey at near mid-length.

Female.—Length about 10 mm.; wing 8 mm.

Frontal prolongation of head light brown; palpi pale brown, the tips of the segments somewhat darker. Antennae with scape and pedicel yellow, flagellum brown; flagellar segments cylindrical; verticils long and conspicuous. Head medium brown; anterior vertex broad, without tubercle.

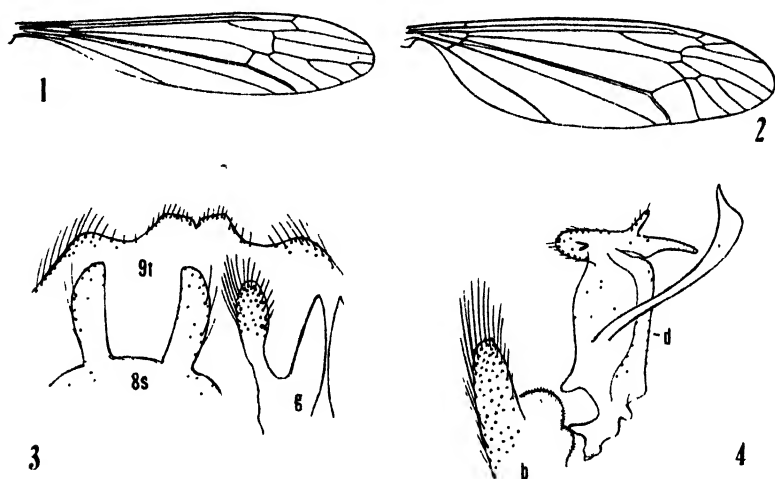
Pronotum brown. Mesonotal praescutum obscure brownish-yellow with slightly differentiated pale brown stripes, the cephalic portion of the median stripe and outer portions of lateral stripes a trifle darker; humeral region more brightened; posterior sclerites of notum brown, the mediotergite still darker. Pleura obscure yellow with a brown girdle extending across propleura, sternopleurite and meron. Halteres elongate, dark brown, the base of stem restrictedly pale. Legs with the coxae testaceous-yellow, the extreme base of fore pair darkened; trochanters pale yellow; femora obscure brownish-yellow, the tips narrowly more infuscated, the amount subequal on all legs; tibiae pale brown, the extreme base whitened, the tip equally narrowly darkened; tarsi snowy-white. Wings (fig. 1) before cord with a weak brownish tinge, the cells beyond cord, especially in outer radial field, strongly darkened; stigma oval, dark brown, preceded and

followed by restricted whitish areas, the former involving all of cell R_1 ; veins dark brown. Sparse macrotrichia in outer ends of cells R_2 to 2nd M_2 , inclusive, most extensive in cell R_2 where there is a linear series of about thirty trichia in distal third of cell (position shown by stippling in figure). Venation: R_{1+2} entirely atrophied; Rs long and gently arcuated, about one-half longer than R_{2+3} ; cell M_1 small, about one-third its petiole; $m-cu$ nearly its own length before fork of M ; cell 2nd A narrow.

Abdomen brownish-black, the tergites at near midlength narrowly ringed with light yellowish-grey, the dark bases and apices much wider on the intermediate segments, narrowed on the outer ones. Ovipositor with cerci very gently upcurved, their tips acute.

Holotype, ♀, Kau-lin San, Kwangtung, altitude 2300–3000 feet, April 24, 1940 (Gressitt & To).

Dolichopeza (*Trichodolichopeza*) *sparsihirta* is the first Oriental member of the subgenus to be defined, the other species being Ethiopian in distribution.



FIGS. 1-4.—1, *Dolichopeza* (*Trichodolichopeza*) *sparsihirta* sp. n.; venation. 2, *Tipula* (*Formotipula*) *stoneana* sp. n.; venation. 3, 4, the same; details of male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *s*, sternite; *t*, tergite.)

By my key to the subgeneric groups of *Dolichopeza* (1931, *Philippine Journal of Science* 46: 270), the fly runs directly to this subgenus and the reference is presumably correct. However, the possibility is not excluded that it may represent an aberrant member of the subgenus *Mitopeza* Edwards, although the structure of the ovipositor is different.

***Tipula* (*Formotipula*) *stoneana* sp. n.**

General coloration orange; head black, probably pruinose in fresh specimens; legs black; wings with a strong blackish suffusion; R_{1+2} entire; abdomen with basal seven segments orange, the outer two segments black in both sexes; male hypopygium large and very complicated in structure, especially the dististyle; eighth sternite bearing two elongate darkened clavate lobes on posterior border.

Male.—Length about 16–18 mm.; wing 18.5–23 mm.; antenna about 4.4–3 mm.

Female.—Length about 18–19 mm.; wing 20–21 mm.

Described from specimens in alcohol. Head, including frontal prolongation and nasus,

black, probably pruinose in fresh material; palpi brown. Antennae brownish-black, the first flagellar segment somewhat paler; flagellar segments vaguely incised; longest verticils exceeding the segments.

Thorax uniform orange. Halteres with stem obscure yellow, knob blackened. Legs with the coxae and trochanters orange; remainder of legs black, the femoral bases restrictedly obscure yellow; claws with a single basal tooth. Wings (fig. 2) with a strong blackish suffusion, the prearcular and costal portions slightly more suffused; stigma slightly darker than the ground; veins brown. Venation: R_{1+2} entire; cell 1st M_2 unusually long for a member of the subgenus; M_{3+4} exceeding the basal section of M_{1+2} .

Abdomen with basal seven segments orange; remainder of abdomen abruptly black. Male hypopygium (figs. 3, 4) with the ninth tergite, 9t, massive, the median region of the caudal border with a small but conspicuous V-shaped notch to form two submedian lobes that are provided with conspicuous setae. Outer lobe of basistyle, *b*, stout, with abundant and conspicuous long black setae. Dististyle, *d*, very complex, as shown; beak very slender; on outer margin at base of beak with a slender pale lobule that bears a few strong setae; on face of style a very long and conspicuous blackened arm, at its apex slightly dilated and produced into an acute spine. Gonapophyses, *g*, appearing as blackened fleshy clavate lobes, provided with long conspicuous setae. Eighth sternite, 8s, with caudal portion produced into two elongate clavate darkened lobes that are sparsely provided with long conspicuous setae, these lobes well separated at bases and gently divergent.

Holotype, ♂ in alcohol, Chengkiang, Yunnan, June 2, 1940 (*C. L. Pu*); United States National Museum. *Allotopotype*, ♀. *Paratopotypes*, 1 ♂, 1 ♀, in author's collection.

I take great pleasure in naming this species in honour of Dr. Alan Stone, to whom I am very greatly indebted for invaluable co-operation in my study of the TIPULIDAE. The nearest relative of the present fly is *Tipula* (*Fornotipula*) *hypopygialis* Alexander, likewise from southern China. This latter differs in details of venation and in the structure of the male hypopygium, which is less complex than in the present fly.

***Limonia* (*Libnotes*) *sappho* sp. n.**

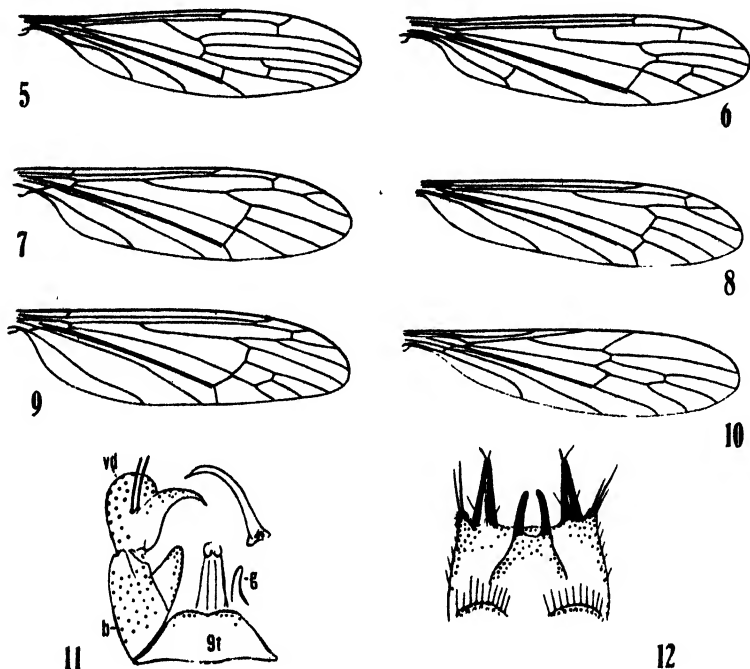
Allied to *amatrix* Alex.; mesonotal praescutum ochreous, with two submedian reddish-brown stripes; central portion of scutum and scutellum pale; femora black, the distal fourth yellow, enclosing a black subterminal ring; wings with a light yellow tinge, conspicuously patterned with light and dark brown; *Rs* unusually straight and oblique; ovipositor with cerci conspicuously bidentate at tips.

Female.—Length about 9.5 mm.; wing 9.5 mm.

Rostrum and palpi black. Antennae with the scape black; pedicel and flagellum abruptly orange-yellow; basal flagellar segments short-oval, the outer segments becoming more elongate (terminal segments broken). Head light fulvous, sparsely pruinose; anterior vertex narrow, less than one-third the diameter of scape.

Cervical region blackened. Pronotum light green. Mesonotal praescutum ochreous, the humeral region more greenish; two conspicuous, reddish-brown, submedian stripes separated by a much narrower median grey line; scutum and scutellum with the median area broadly pale, the centres of the scutal lobes and lateral portions of scutellum strongly infuscated, the lateral portions of scutal lobes ochreous; central portion of mediotergite dark brown, this area more expanded across the cephalic portion of sclerite, the remainder, with the pleurotergite, ochreous. Pleura ochreous yellow, with a narrow brownish-black longitudinal stripe extending from the propleura obliquely dorsad to the wing-root. Halteres with stem yellow, knob dark brown. Legs with the coxae yellow, tinged with greenish,

especially the posterior pair; trochanters yellow; femora black, including the extreme base, the distal fourth yellow, enclosing a broad black subterminal ring that much exceeds the narrow yellow apex or the slightly wider subterminal yellow ring; tibiae and tarsi black. Wings (fig. 5) with a light yellow tinge, the prearcular region, cell *Sc* and outer margin of radial field more saturated yellow; a conspicuous dark brown and paler brown pattern, arranged as follows: Basal half of cell *Sc* darkened; darker brown seams along



FIGS. 5-12.—5, *Limonia (Libnotes) sappho* sp. n.; venation. 6, *Limonia (Discobola) acurostris* sp. n.; venation. 7, *Hexatoma (Hexatoma) mediocornis* sp. n.; venation. 8, *Hexatoma (Hexatoma) prolixicornis* sp. n.; venation. 9, *Hexatoma (Eriocera) gressittiana* sp. n.; venation. 10, *Styringomyia princeps* sp. n.; venation. 11, *Limonia (Discobola) acurostris* sp. n.; male hypopygium. 12, *Styringomyia princeps* sp. n.; ovipositor.

(Symbols: *b*, basistyle; *g*, gonapophysis; *dd*, dorsal dististyle; *t*, tergite; *vd*, ventral dististyle.)

cord, outer end of cell 1st M_2 , distal half of vein *Cu* and as conspicuous marginal seams on veins R_2 and free tip of Sc_2 , R_3 , M_{1+2} , M_3 , M_4 and both anal veins, on vein 2nd *A* very extensive; no apical darkening on vein R_{4+5} ; paler brown washes in outer radial and medial fields to produce a weak reticulated pattern; a post-arcular darkening in cells *R* and *M*; marginal clouds between the veins in cells M_4 , *Cu*, 1st *A* and 2nd *A*; veins yellow, darkened in the patterned areas. Venation: R_s unusually straight and oblique, arcuated only on outer fifth; cell 1st M_2 shorter than vein M_{1+2} beyond it; *m* angulated at near midlength; *m-cu* at near two-fifths the length of lower face of cell 1st M_2 ; cell 2nd *A* very strongly narrowed at base.

Abdomen greenish-yellow, more darkened laterally at base; cerci relatively short, conspicuously bidentate at tips.

Holotype, ♀, Kau-lin San, Kwangtung, altitude 2300–3000 feet, April 22, 1940 (Gressitt & To.)

Limonia (*Libnotes*) *sappho* is a member of the group of species centring about the Eastern Palaearctic *L. (L.) amatrix* (Alexander) and including among other species in the Oriental and Australasian regions, *L. (L.) klossi* Alexander, *L. (L.) perrara* Alexander, and *L. (L.) terrae-reginae* (Alexander). The present fly differs from all of the above in the coloration of the body, legs and wings, and in the details of venation, notably the nearly straight and oblique *Rs*.

***Limonia* (*Discobola*) *acurostris* sp. n.**

General coloration of mesonotal praescutum dark chestnut-brown, still darker medially; thoracic pleura with a broad blackened longitudinal stripe, the ventral pleurites pale, grey pruinose; femora obscure yellow, with a broad black subterminal ring; wings yellow, with a heavy brown pattern that includes major entire areas, not ocellate as is common in the subgenus; cells basad of cord with numerous smaller brown dots; male hypopygium with the caudal margin of tergite only feebly emarginate; rostral prolongation of ventral dististyle a compressed blade that narrows to an acute point; spines of ventral dististyle very long, placed at base of prolongation.

Male.—Length about 8 mm.; wing 9 mm.

Rostrum and palpi black. Antennae black, only the short apical pedicels of the flagellar segments restrictedly paler; longest verticils subequal in length to the segments. Head dark blackish-grey; anterior vertex relatively narrow, about two-thirds the diameter of scape.

Pronotum obscure brownish-yellow. Mesonotal praescutum dark chestnut-brown, even darker medially, the entire central portion subnitidous, the lateral and humeral regions more yellow pollinose; lateral portions of praescutum and scutum more blackened; median region of scutum and base of scutellum heavy golden-yellow pollinose; remainder of scutellum and the postnotum brownish-black, sparsely pruinose. Pleura with a broad blackened longitudinal stripe on the dorsal pleurites and the pleurotergite; ventral pleurites pale, grey pruinose. Halteres with extreme base of stem yellow, the remainder darkened, the distal portion of stem and apex of knob obscure yellow, the base of knob conspicuously blackened. Legs with the coxae brownish-yellow; trochanters yellow; femora obscure yellow, with a broad black subterminal ring, the tips narrowly yellow, the amount about one-half of the subterminal dark ring; tibiae and tarsi light brown. Wings (fig. 6) with the ground colour yellow, slightly deeper and more saturated on the anterior third; wing disk with large, entire, dark brown areas, and numerous smaller brown dots; the major areas are as follows: Bases of cells *R* and *M*; origin of *Rs*, reaching costa; a narrow darkening at fork of *Sc*, continued caudad as a narrow line to the cord; stigmal area and a very broad posterior extension back to the cord; other large marginal areas at ends of all the cells, very extensive in cells *M*₄, *Cu*, 1st *A* and 2nd *A*; narrow dark seams on posterior cord, outer end of cell 1st *M*₂, and over the supernumerary crossvein in cell 1st *A*; the smaller brown dots are very numerous in all cells basad of cord, especially in cells *R*₁, *R*, *M* and *Cu*; veins yellow, darker in the clouded areas. Venation: *R*₁₊₂ about two-thirds *R*₂₊₃; inner end of cell 1st *M*₂ arcuated.

Abdomen brown, the subterminal segments darker; incisures restrictedly pale; sternites more yellow; hypopygium yellowish-brown. Male hypopygium (fig. 11) with the tergite, 9t, transverse, the caudal margin only slightly emarginate, the lateral lobes thus very broad and low. Basistyle with ventromesal lobe slender, pale. Dorsal dististyle, *dd*, a strongly curved blackened rod, its tip acute (in figure shown detached so as not to obscure the ventral style). Ventral dististyle, *vd*, with the body relatively small, the rostral portion correspondingly large, appearing as a broad compressed blade that narrows to an acute

point, the apex and ventral edge of the blade more sclerotised and provided with fewer setae than the dorsal portion; the usual rostral spines two, entirely pale, very long, placed in the notch between the body of style and the base of the prolongation, closely approximated at base. Gonapophyses, *g*, with mesal-apical lobe nearly straight, the tip obtuse.

Holotype, ♂, Mount Omei, Szechwan; Chu Lao Tong Temple, altitude 7000 feet, July 28, 1935 (*Franck*); Alexander Collection.

Limonia (Discobola) acurostris is so different from the seven other species of the subgenus now known from Asia and its adjoining islands that comparison is scarcely necessary. The unbroken nature of the major brown areas of the wing and the male hypopygium are quite different from all other regional species.

Hexatoma (Hexatoma) mediocornis sp. n.

General coloration dark grey; antennae (male) relatively elongate, only a little shorter than the body; halteres infuscated; wings with a weak brownish tinge, the stigma very slightly darker; cell R_3 very short; vein R_3 short, oblique to suberect, shorter than $R_3 + 4$.

Male.—Length about 5 mm.; wing 5.6 mm.; antenna about 4.6 mm.

Female.—Length about 6 mm.; wing 6.3 mm.; antenna about 1 mm.

Rostrum dark brown; palpi long and conspicuous, brown, the outer segments passing into black. Antennae (male) 6-segmented, nearly as long as body, brownish-black; first flagellar segment shorter than the second; third and fourth subequal, about one-third longer than the second; first flagellar segment stout, especially basally; first three flagellar segments with strong scattered setae from raised tubercles; outer segment with the setae more slender and normal. Antennae (female) 9-segmented; first flagellar segment about as long as the three succeeding segments combined; second and third subequal; remaining flagellar segments gradually decreasing in size, the outer two oval; segments with elongate delicate setae that are not spinous. Head grey; vertical tubercle of male bulbous, entire; of female much smaller.

Thorax almost uniform dark grey, the praescutum and scutum not or scarcely patterned with darker; praescutal setae lacking. Halteres infuscated, especially the knobs. Legs with the coxae dark grey; trochanters brownish-yellow; remainder of legs brownish-black, the femoral bases restrictedly paler. Wings (fig. 7) with a weak brownish tinge, the oval stigma very slightly darker; veins pale brown. Veins beyond cord very weak to subevanescent, especially in the medial field; no trichia on these veins excepting a very restricted series of about ten on distal section of vein R_5 . Venation: Cell R_3 very short, veins R_4 and $R_3 + 4$ subequal or the former a little longer; vein R_2 short, oblique to suberect, shorter than $R_3 + 4$; *m-cu* at or just beyond the fork of *M*.

Abdomen, including hypopygium, black, grey pruinose. Ovipositor with obtuse valves, as in the subgenus.

Holotype, ♂, Sinfung to Lung Kai, Kwangtung, April 12, 1940 (*Gressitt*).
Allotopotype, ♀.

Hexatoma (Hexatoma) mediocornis is well distinguished from the allied species of the subgenus in eastern Asia by the length of the antennae of the male which are shorter than in *H. (H.) prolixicornis* sp. n., but much longer than in the remaining species in China and Japan.

Hexatoma (Hexatoma) prolixicornis sp. n.

General coloration pale brown, sparsely pruinose; antennae (male) greatly elongated, exceeding twice the length of body or wing; flagellar segments provided with scattered spinous setae and an abundant erect pale pubescence; wings brownish-grey, stigma lacking; outer medial veins very weak and evidently in process of atrophy.

Male.—Length about 6 mm.; wing 6.5 mm.; antenna about 13.5 mm. Antenna: 1st flagellar segment 2 mm.; 2nd, 3 mm.; 3rd, 5.2 mm.; 4th, 3 mm.

Rostrum pale brown; palpi dark brown. Antennae (male) unusually long, exceeding twice the length of body, as shown by the measurements, dark brown throughout; all four flagellar segments provided with conspicuous scattered black spinous setae (12–15 on flagellar segments two and three; 5–6 on segment four); besides this armature, the segments provided with an abundant erect pale pubescence. Head dark brown, heavily light grey pruinose; anterior vertex wide, approximately five times as wide as diameter of scape; tubercle low and relatively inconspicuous; eyes relatively small, narrowly separated beneath.

Pronotum pale brown. Mesonotum pale brown, sparsely pruinose, the praescutum without stripes. Pleura pale brown, conspicuously pruinose. Halteres pale. Legs with the coxae pale brownish-yellow, sparsely pruinose; trochanters yellow; remainder of legs broken. Wings (fig. 8) brownish-grey, stigma lacking; veins pale brown. Macrotrichia of veins virtually lacking, behind *R* there being a sparse series on distal section of *R*₅; outer medial veins very weak and faint, evidently in process of atrophy. Venation: *Sc*₁ ending about opposite fork of *Rs*, *Sc*₂ a short distance from its tip; *R*₂ a trifle longer than *R*₁₊₂, at fork of *R*₂₊₃₊₄; *R*₂₊₃₊₄ longer than *R*₃; *m-cu* about one-third its length beyond the fork of *M*, a little exceeding the distal section of *Cu*₁.

Abdomen dark brown, the surface weakly pruinose; hypopygium more brownish-yellow.

Holotype, ♂, Tai-kang to Mui-hang, via Lan-tin, Tung-men District, Kwang-tung, April 9, 1940 (*Gressitt & To*).

Hexatoma (*Hexatoma*) *prolixicornis* is readily told from other allied species in eastern Asia by the unusual length of the antennae in the male, in conjunction with the venation, especially the long *R*₂₊₃₊₄, with *R*₂ at its fork.

Hexatoma (*Eriocera*) *gressittiana* sp. n.

General coloration of thorax dark brown, the praescutum with three more blackened stripes; antennae (male) elongate, at least twice the length of the wing; head and thorax with unusually long and abundant, erect, black setae; legs brown to brownish-black; wings light brown, the costal border and seams on the longitudinal veins darker brown; cell *M*₁ lacking.

Male.—Length about 13 mm.; wing 15.5 mm.; antenna exceeding 30 mm.

Rostrum obscure brownish-yellow, very short; palpi black. Antennae (male) elongate, at least twice the length of wing, in the unique type, the terminal segments broken; scape obscure yellow beneath, darker on dorsal surface; scape unusually tumid, bearing a conspicuous lobe on lower face near base; pedicel brown; flagellum black; flagellar segments very long-cylindrical; only the basal three preserved, these becoming progressively more elongate (1st segment, 6 mm.; 2nd, 8 mm.; 3rd, 14.3 mm.); all preserved flagellar segments with a double row of spinous bristles, with about 21 pairs on segment one, 29 on segment two and 28 on segment three. Head brownish-grey, the orbits lighter grey; vertical tubercle paler brown except in front, unusually large and tumid, approximately as long as, but even stouter than the scape; vertical tubercle clothed with very long erect setae; other groups of similar setae on genae and mouthparts.

Pronotum and mesonotum almost uniformly dark brown, the praescutum with three more blackened stripes, the usual interspaces reduced; entire praescutum, scutum and scutellum abundantly clothed with long erect dark setae, these occurring both on the praescutal interspaces and on the stripes. Pleura black, sparsely pruinose, the meron and pleurotergite more heavily so; groups of long black setae on propleura and pleurotergite. Halteres with stem brown, knob more blackened. Legs with the coxae black, sparsely

pruinose; trochanters black; remainder of legs brown to brownish-black, conspicuously hairy. Wings (fig. 9) broad, especially across the basal fourth; ground colour light brown, patterned with darker brown, this including the prearcular field; cells *C* and *Sc*; stigma; and broad seams along cord, outer end of cell 1st M_2 , and all longitudinal veins; veins brown. Macrotrichia on veins of outer radial field, including series on veins R_{2+3+4} , R_{2+3} , R_3 , R_4 and R_5 , with very sparse scattered trichia on second and third sections of vein M_{1+2} ; veins R_{1+2} , R_2 and all outer branches of *M* and *Cu* without trichia. Venation: Sc_1 ending beyond four-fifths the length of R_{2+3+4} , Sc_2 some distance from its tip; R_{1+2} and R_{2+3} subequal; *m-cu* just beyond the fork of *M*; cell M_4 very wide at margin, subequal in extent to cell 1st *A*; distal end of cell *Cu* widened.

Abdomen, including hypopygium, black.

Holotype, ♂, Sinfung to Lung Kai, Kwangtung, April 12, 1940 (*Gressitt*).

I am privileged to name this distinct fly in honour of the collector, Mr. J. Linsley Gressitt. From other regional species of the subgenus that have cell M_1 lacking and the antennae of male greatly lengthened, the fly differs very conspicuously in the heavily patterned wings and in the unusual development of setae on the head and thorax. Despite certain venational features, the species will probably be placed best in the *verticalis* group.

Styringomyia princeps sp. n.

Size large (wing, female, 5.5 mm.); general coloration testaceous brown; femora yellow, the fore and middle pair each with a single narrow pale brown subterminal ring, the posterior femora uniformly pale yellow; wings with a strong yellow tinge, with a weak brown cloud on anterior cord; ovipositor with both cerci and hypovalvae blackened and sclerotised.

Female.—Length about 6.5 mm.; wing 5.5 mm.

Rostrum yellowish-brown; palpi pale brown. Antennae with the scape light brown, pedicel more testaceous; flagellum obscure yellow; flagellar segments passing through oval to elongate; verticils long and conspicuous. Head light brown; setae proclinate.

Pronotum and mesonotum testaceous brown, without distinct pattern; scutellum and postnotum somewhat clearer yellow; setae erect and coarse but relatively sparse; two long setae on scutellum. Pleura testaceous brown. Halteres pale, knob weakly darkened. Legs with coxae and trochanters pale; femora yellow, the fore and middle pair each with a single, narrow, pale brown, incomplete, subterminal ring, broken beneath, the pale apex beyond approximately twice the ring; posterior femora uniform pale yellow; tibiae yellow, the tips very narrowly and inconspicuously infuscated, the posterior pair uniform yellow; tarsi yellow, the last segment darkened. Wings (fig. 10) with a strong yellow tinge, the anterior cord and outer end of cell 1st M_2 weakly darkened, best indicated by a deepening in colour of the veins, *r-m* brown, remaining veins yellow. Costal fringe relatively long and dense. Venation: Cell 2nd M_2 sessile; vein 2nd *A* simple, curved gently to margin, the cell wide.

Abdominal tergites brownish-yellow, the extreme caudal borders of segments darkened to produce a scarcely differentiated line; sternites clearer yellow. Ovipositor (fig. 12) with both cerci and hypovalvae heavily blackened and sclerotised, as shown.

Holotype, ♀, Kau-lin San, Kwangtung, altitude 3500 feet, April 21, 1940 (*Gressitt & To*).

Styringomyia princeps is quite distinct from all other described species, differing especially in the unusually large size, immaculate posterior femora, and structure of the ovipositor. By Edwards's key (1914, *Trans. ent. Soc. Lond.* 1914: 210-212), the fly runs to *S. didyma* Grimshaw, a very different species.

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**Series B.
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PROCEEDINGS OF THE
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VOLUME 13.

1944.

MESSOR AEGYPTIACUS EMERY SUBSPECIES *CANALICULATUS*
SUBSP. N. (*STRIATICEPS* SANTSCHI? (1923) *NEC* ER. ANDRÉ
(1883)) (HYM. FORMICIDAE)

By HORACE DONISTHORPE, F.Z.S., F.R.E.S.

Department of Entomology, British Museum (Nat. Hist.).

♂. Black, shining, mandibles and last four joints of the tarsi reddish, furnished with sparse outstanding golden hairs, forming a row on the clypeus. Psammophores present. *Head* large, broad, slightly transverse, very slightly broader posteriorly, sides almost straight, posterior angles rounded, posterior border slightly emarginate in middle. Finely longitudinally striate, more strongly so on cheeks and on disc; puncturation consisting of fine, small, shallow, scattered punctures; *mandibles* massive, broad, triangular, deeply longitudinally striate, masticatory border armed with two large broad rounded teeth at apex, and a number of smaller teeth behind, worn almost flat (these are more visible on the underside); *clypeus* transverse, anterior border slightly excavate in middle, sinuate at each side, disc convex and rather strongly longitudinally striate; *frontal area* rather shallow, more finely striate than clypeus, rounded posteriorly; *frontal carinae* with sharp raised rims, slightly divergent posteriorly; *eyes* moderate, round oval, slightly convex, with many facets; *antennae* fairly long; *scape* narrow and somewhat curved, not reaching posterior margin of head; *funiculus* gradually increasing in breadth to apex, first joint slightly longer than the rest, last joint slightly longer than the one preceding it. *Thorax* not long though longer than broad, constricted in middle; *pronotum* large, round, convex, furnished with a neck raised at anterior margin, anterior angles and sides rounded, neck rather rugosely punctured, space between neck and disc transversely striate, disc irregularly and finely longitudinally striate, sides more evenly and strongly so; *mesonotum* longer than broad, convex, rather sharply pointed at apex, narrowed towards base, finely longitudinally striate, and with sparse, shallow, scattered punctures, sternite of mesothorax rather strongly transversely striate; furrow between mesonotum and epinotum rather deep and transversely striate; *epinotum* armed with a rather broad rounded projection on each side, which possesses sharp edges slightly bending outwards and downwards, the *dorsal surface* longer than the declivity and hollowed out, forming a furrow before and between the projections, transversely striate, *declivity* rather abrupt, flat, transversely striate, sides of epinotum transversely striate, sternite and episternite of metathorax longitudinally striate; *peduncle of petiole* rather long with a slight projection on each side before middle, *node of petiole* high, rounded above and at sides, posterior surface flat; *post-petiole* transverse, rounded above and at sides, not as high as node of petiole. *Gaster* very shining, sculpture very finely coriaceous and with some small, sparse, shallow, scattered punctures, more abundant on first segment. *Legs* moderate. *Long.* 9 mm. to 10.5 mm.

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Type in the British Museum (Natural History).

♀. The workers vary in size, the smallest measuring 5.5 mm. The structure and sculpture is the same as in the soldiers, except that the head is longer and narrower, not being transverse. The pronotum is reddish in some of the smaller workers, and in a few small specimens the thorax is entirely reddish.

Described from a number of soldiers and workers sent to me by Mr. W. Pickles from Algeria. He informed me that he has found them on several occasions in conflict with *Messor barbarus barbarus* L. In 1923 Santschi wrote

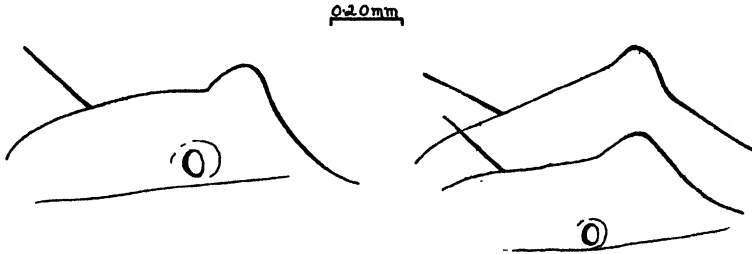


FIG. 1.—*Messor aegyptiacus* Emery subsp. *canaliculatus* subsp. n. Epinotum in profile and viewed obliquely.

of *Messor aegyptiacus* Emery (1878) as a species which is typical of a group of desert, or semi-desert, forms. Emery in the *Genera Insectorum* (1921) treated *aegyptiacus* as a subspecies of *Messor barbarus* L. In my opinion Santschi's

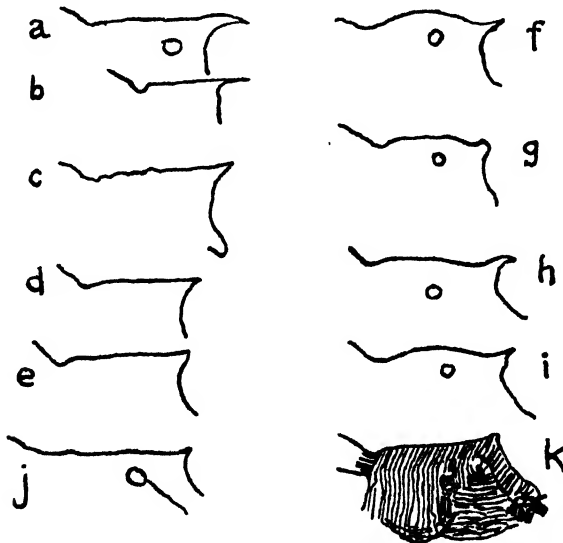


FIG. 2.—"Profil de l'épinotum chez les diverses variétés du *Messor aegyptiacus* Em." (a) *v. foreli* larger ♀; (b) *ibid.* smaller ♀; (c) *v. fossulatus* larger ♀; (d) *ibid.* smaller ♀; (e) *v. brevispinosus* ♀; (f) *v. aegyptiacus* ♀; (g) *v. tunetinus* ♀; (h) *v. striatulus* larger ♀; (i) *v. felah* larger worker; (j) *Messor striaticeps* André (type) ♀; (k) *ibid.* oblique view.

view is correct, for the epinotum of *barbarus* is totally unarmed, whereas in *aegyptiacus*, and the allied forms it is armed with spines, teeth, or projections. Santschi gives a diagram (which is reproduced here) showing the epinotum in profile of the different forms; but for what he calls *striaticeps* André he also gives an oblique view. This is evidently not Er. André's *striaticeps*, for that insect has a sharp spine to the epinotum. André in his original description (1883¹) writes—"d'épines bien accentuées au metanotum" (now called the epinotum). Furthermore the specimens of *striaticeps* in the British Museum possess such spines, and one of these, ex coll. Donisthorpe, bears Forel's identification label. Santschi does not give a description of *striaticeps*, but I think it is probable that his figure refers to our insect, though it does not really agree with it. Both occur in Algeria; but in any case Santschi's ant requires a new name as it is clearly not *striaticeps* André.

Karawajew redescribed Emery's *striatulus* (1891) under the name of *curvispina* (1912), which latter name sinks, of course, as a synonym.

I am indebted to Dr. H. E. Hinton for the outline drawings, and to Mr. W. H. T. Tams for the reproduction of Santschi's diagram.

The forms figured by Santschi are as follows.

1. *Messor aegyptiacus* Emery, 1878, *Ann. Mus. Stor. nat. Genova* 12 : 57 (*Messor barbarus* L. subsp. *aegyptiaca* Emery in *Genera Insectorum*).

2. *Messor aegyptiacus* Emery var. *brevispinosus* Stitz, 1917, *Mitt. zool. Mus. Berlin* 8 : 344 (*Messor barbarus* L. subsp. *striaticeps* Er. André var. *brevispinosa* Stitz in *Genera Insectorum*).

3. *Messor aegyptiacus* Emery var. *felah* Santschi, 1923, *Rev. suisse Zool.* 30 : 321.

4. *Messor aegyptiacus* Emery var. *foreli* Santschi, 1923, *Rev. suisse Zool.* 30 : 322.

5. *Messor aegyptiacus* Emery var. *fossulatus* Santschi, 1923, *Rev. suisse Zool.* 30 : 323.

6. *Messor aegyptiacus* Emery var. *striatulus* Emery, 1891, *Expl. Sc. Tunisie* : 11, 12. (*Messor barbarus* L. subsp. *striaticeps* Er. André var. *striatula* Emery in *Genera Insectorum*) = *curvispinosus* Karawajew, 1912, *Rev. russe Ent.* 12 : 10. (*Messor barbarus* L. subsp. *striaticeps* Er. André var. *curvispinosa* Karawajew in *Genera Insectorum*.)

7. *Messor aegyptiacus* Emery var. *striaticeps* Santschi, 1923, *Rev. suisse Zool.* 30 : 321, nec Er. André 1883.

LITERATURE.

ANDRÉ, Er., 1883, *Spec. Hym. Europe Algérie* 2 Fourmis : 356.

EMERY, C., 1878, *Ann. Mus. Stor. nat. Genova* 12 : 57.

—, 1891, *Expl. Sc. Tunisie Fourmis* : 11, 12.

—, 1921, *Genera Insectorum* Fasc. 174a : 69-73.

KARAWAJEW, W., 1912, *Rev. russe Ent.* 12 : 10.

SANTSCHI, F., 1923, *Rev. suisse Zool.* 30 : 321.

STITZ, H., 1917, *Mitt. zool. Mus. Berlin* 8 : 344.

¹ In the *Genera Insectorum* the date is given as 1882, but as pointed out in André's work (before the index) pages 281-548 were published in 1883.

A CONCHASPID FROM KURDISTAN AND ITS IMPORTANCE IN THE PHYLOGENY OF THE DIASPIDAE (HEMIPTERA)

By F. S. BODENHEIMER, F.R.E.S.

(Hebrew University, Jerusalem).

DURING a trip through Iraqi Kurdistan in October 1942 one specimen of a Conchaspid was collected on *Ephedra alte* near Shuarta. This is the first occasion on which a member of this family has been discovered in the Palaearctic region; all other species are Neotropic, with the exception of *Conchaspis socialis* Green. This distribution in itself proves the antiquity of the family.

The full description of this insect, which I have named *Archaspis ephedrae*

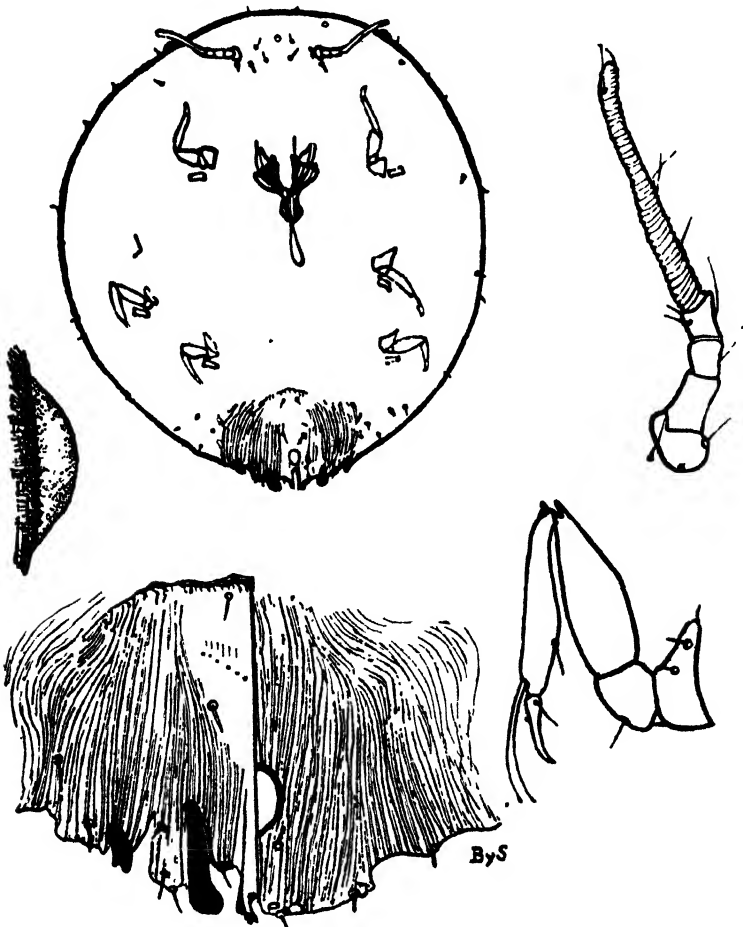


FIG. 1.—*Archaspis ephedrae* Bodenheimer. Adult female, antenna, scale, hind leg and pygidium of adult female.

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gen. and sp. n., has appeared elsewhere (1943, *Mem. Direct. Gen. Agric. Iraq*). The genus differs from *Conchaspis* Cockerell in having true pygidial lobes, a clearly defined body segmentation, the eyes in a marginal position, and the claws very long and slender without the spur or swelling in the basal region of the inner margin.

The features which characterise the new insect as belonging to the CONCHASPIDAE are as follows :—

1. The structure of the female scale with exuviae wanting.
2. The presence of 3 pairs of spiracles in the typical position; these being caudad of the legs it is obvious that the third pair are the spiracles on the first abdominal segment. Balachowsky's assumption that all three pairs of spiracles are thoracic is not tenable.
3. Legs lacking tibio-tarsal articulation, but not inserted as close to the margin as in the known species of the genus *Conchaspis*.

The antennae of the new species are 5-jointed and strongly resemble the typical larval antennae of the DIASPIDAE. The antennae of the female are similar to those of the larva in the only known *Conchaspis* larva (Newstead).

Finally, the character of the last abdominal segments is of importance. The writer was never convinced by Stickney's theory that the PHOENICOCOCCIDAE were the ancestors of the DIASPIDAE. The tendency to form pygidial-like structures has obviously originated in various families, but no true lobes are known in any Phoenicococcid. Newstead's theory that the CONCHASPIDAE are the true ancestors of the DIASPIDAE is much strengthened by the discovery of the genus *Archaspis* in which, in addition to the primitive scale and the pygidial character of the terminal abdominal segments, true pygidial lobes and larval antennae of a Diaspid type occur. Unfortunately the specimen did not permit of a study of the integumental glands.

The CONCHASPIDAE are certainly a very archaic family representing one of the stages in the development of the Neococcoidea out of the Archaeococcoidea (ORTHEZIIDAE, MARGARODIDAE). It is certainly much more archaic than the COCCIDAE or the PSEUDOCOCCIDAE. Its phylogenetic position is at the beginning of the NEOCOCCIDAE together with the PHOENICOCOCCIDAE and perhaps with the DACTYLOPIIDAE.

NEW SPECIES OF *APION* FROM TIBET (COL., CURCULIONIDAE)

By J. BALFOUR-BROWNE, M.A., F.Z.S., F.R.E.S.

Apion paracoeleste sp. n.

♂♀. Derm black, the elytra bluish-metallic; rostrum in both sexes obsoletely but distinctly and finely microreticulate, curved, cylindrical; pronotum as wide as long, distinctly punctured, anteriorly moderately strongly constricted; elytra strongly and deeply striate; legs moderately long and slender.

Head slightly wider than long, the eyes moderately prominent, rather rounded; frons as wide as the base of the rostrum, flat, microreticulate, with two longitudinal series of punctures extending on to the base of the rostrum; temples moderate, about three-fifths of the diameter of the eye, rather rugose-punctate. *Rostrum* of male shorter than the head and pronotum but longer than the pronotum alone, of the female as long as the head and pronotum taken together, cylindrical, weakly curved, rather slender, slightly wider from the base to the antennal insertion than beyond the antennal insertion, parallel-sided; basally distinctly punctured, the interstices distinctly microreticulate, apically extremely finely and sparsely, more distinctly laterally, punctulate, sub-obsoletely reticulate laterally, quite shining dorsally; a vague trace of the basi-lateral sulcus occasionally present. *Antennae* quite long and slender, inserted at one-third of the length of the rostrum from the base in the male, at one-quarter in the female; scape short, one and one-third times the length of the basal segment of the funicle which is not longer but is one and one-half times wider than the second funicular segment; third to seventh segments progressively shorter but barely wider, seventh square; club elongate fusiform, widest at middle segment which is nearly twice as long as the basal segment; fusco-testaceous basally, fuscous apically, club black; throughout clothed with rufescent setae. *Pronotum* not longer than wide, widest at base which is almost straight; sub-basal and sub-apical constrictions well marked, the sides at middle rather markedly rounded; dorsal outline very weakly convex; sub-obsoletely punctured, the interstices on the disc about equal to the diameter of the punctures, each of which bears a short fine greyish-white hair; a shallow medio-dorsal sub-basal fovea more or less developed. *Scutellum* small, triangular, as long as wide at the base. *Elytra* ovate, sides well rounded, widest at middle; humeral callus well developed; dorsal outline highly and quite evenly convex; quite strongly striate, the striae distinctly catenate-punctate, the punctures appearing eccentric, the intervening space between neighbouring punctures about half the diameter of the puncture and bearing a very short golden hair; interstriae convex, very finely and sub-obsoletely microreticulate, dull, obscurely bilinearly set with very fine punctures, each bearing an excessively short fine golden hair; striae 1 and 2 uniting with 9 at apex; elytral apices rounded in both sexes. *Venter* distinctly microreticulate; metasternum finely and sparingly, apparent first and second ventrites more strongly but sparingly, apparent fifth ventrite quite strongly and quite densely punctured, more strongly,—almost rugosely,—in the male than in the female, all punctures bearing greyish-white hairs. *Legs* long and slender, hind femora just reaching the apex of the elytra; tarsi short, second segment of hind tarsi half the length of the basal segment, third segment deeply bilobate, wider than long, apparent fourth segment not longer than the basal segment; claws strong, black, very sharply curved close to the base and rather long, rather acutely dentate at the base beneath.

Length: 2.22–2.53 mm. (*sine rostro*).

Holotype ♂, TIBET: Rongshar Valley, 10,000 ft., 26.vi.1924 (*Maj. R. W. G. Hingston* coll.) (1924 Mt. Everest Expedition). *Allotype* ♀, same locality but
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11,000 ft., 27.vi.1924. *Paratypes*, 3 ♂♂, same particulars as holotype; 2 ♂♂, 1 ♀, same particulars as allotype; 1 ♂, INDIA: Darjeeling (G. Rogers coll.) (*coeleste* Fst. ♀, Wagner det.).

This species runs to *coeleste* Fst. in Wagner's key (1906-08, *Münch. koleopt.* Z. 3: 196, 310) to the species of the *elegantulum*-group, but it is easily distinguished from that species by the more finely punctured rostrum, the more obsoletely punctured pronotum with distinct sub-basal and sub-apical constrictions (obsolete in *coeleste*) and much more finely punctured venter, as well as by the larger size and less brightly metallic colour of the elytra.

Apion kaulbacki sp. n.

♂. Derm black, elytra faintly bluish-metallic; scutellum extremely short, barely visible; elytra elongate-oval, humeral callus very obsolete; first stria attaining the base of the elytra; elytra distinctly striate, the stria punctures very obsolete; legs short; claws simple.

Head twice as wide as long, eyes not very prominent, moderately rounded; frons very strongly and vaguely linearly punctate, as wide as the base of the rostrum, flat, slightly longitudinally rugose; vertex decidedly rugose due to the closeness of the punctures, interstices of punctation very obsoletely microreticulate; temples linear; beneath the eyes and behind the temples transversely finely ridged. *Rostrum* very slightly longer than the pronotum, stout, cylindrical, slightly curved, moderately strongly and densely punctured, particularly at the base where the punctures are somewhat linear, the punctural interstices throughout more or less distinctly microreticulate except at the extreme apex; at the apex beneath with a shining median longitudinal ridge with an impressed punctate line on each side, the punctures therein numbering four to five and separated each from its neighbouring puncture by a space about equal to the diameter of the punctures; beneath the antennal insertion strongly and deeply microreticulate, shagrinete. *Antennae* inserted at about one-third of the length from the base, quite short and stout; scape short, barely one and one-half times the length of the basal segment of the funicle which is twice as long as wide and one-quarter longer than the second segment; third to seventh segments progressively shorter but barely broader; seventh square; club ovoid, quite elongate, the basal segment as long as the second and third segments taken together; entire antenna clothed with sparse brownish-grey setae. *Pronotum* one-fifth longer than wide, widest at middle, sides weakly rounded, sub-basal and sub-apical constrictions quite obsolete; base evenly rounded; dorsal outline very weakly convex, almost flat; strongly, evenly and quite densely punctured, the punctures on the disc separated from each other by about three-quarters of their diameter. Interstices finely and obsoletely microreticulate except at the base where the reticulation is quite distinct; a distinct but shallow medio-dorsal striole or elongate fovea sub-basally. *Scutellum* punctiform, barely visible. *Elytra* elongate-oval, faintly bluish-metallic; humeral callus very obsolete but the shoulder quite distinct in comparison with related species; dorsal outline very flatly rounded except posteriorly; sides weakly rounded to the widest point which is behind the middle, then more strongly rounded to the apex; shallowly but distinctly striate, the stria punctures decidedly obsolete and separated by a space twice to three times their diameter; striae 1 and 2 uniting with 9 at apex; stria 1 quite attaining to the base; interstriae flat, three times as wide as the striae, shining, distinctly and finely irregularly bilinear punctulate except at the sutural margin which is regularly unilinear punctulate, the punctures throughout bearing fine reddish-golden setae. *Venter* shining, metasternum and apparent first and second ventrites moderately finely and distinctly but sparsely punctate; apparent fifth ventrite closely, strongly and sharply punctate, the punctures separated by not more than half their diameters. *Legs* short, trochanters rather strongly punctured; hind femora not attaining the apex of the abdomen;

tibiae quite short, the four posterior ones without an interno-apical spur; tarsi short, the three basal segments subequal in length and breadth, the apparent fourth segment equal to the two basal segments taken together; claws short, simple, evenly curved.

Length: 2.5–2.6 mm. (*sine rostro*).

Holotype ♂, EAST TIBET: Lhodzong, Poshō, 12,600 ft., 15.v.1936 (R. J. H. Kaulback coll.). *Paratype* ♂, same particulars.

This species belongs to the *ebeninum*-group (the so-called sub-genus *Synapion* Schilsky), and is apparently most closely related to *pistillum* Fst. which I have not seen, from Transcaspiā: Issyk-Kul, Przewalsk, according to Schilsky's key (Kuster-Kraatz, 1906, *Käf. Eur.* 43: xxxiv). Faust does not name the sex of specimen(s) used for the description and Schilsky later described a species on the male only from the same area, *substriatum* Schilsky, which Wagner (1906–08, *Münch. koleopt. Z.* 3: 195) synonymises with *pistillum*. Schilsky describes *substriatum* as possessing "unten am Kinn befindet sich ein schwaches Höckerchen" but makes no mention of this structure in his description of *pistillum* based upon a specimen in the Dresden Museum (Faust's type?), which he presumed to be a female. Wagner states that this process of the (?) submentum is distinctly visible in Faust's type, which suggests that a critical re-examination of the original types is necessary. *A. kaulbacki* definitely possesses no such structure and both specimens before me are indubitably males, the holotype having been selected as having the apex of the aedeagus visibly protruding and the apparent fifth ventrite of the paratype having the same structure—transverse, not triangular—as in the holotype. *A. kaulbacki* further differs from *pistillum* by the stronger elytral striae which could not be described as "obsoletissime" and the definitely flat irregularly biseriate interstriae and also by the distinctly rounded base of the pronotum.

A. irkutense Fst. appears also to be closely related but the description indicates that the elytral striae are distinctly catenate-punctate which should separate it from the new species without difficulty.

Apion tibetanum sp. n.

♂. Derm black, antennae and legs fuscous; rostrum weakly inflated at antennal insertion; frons strigulose; antennae of the same thickness from the scape to the seventh segment; scutellum very small, punctiform; elytra elongate-oval, humeri obsolete, striae strongly impressed; legs short, basal segment of the hind tarsus with a strongly developed termino-ventral spine; claws short, simple.

Head twice as wide as long, eyes not prominent, moderately rounded; frons quite as wide as the base of the rostrum, flat, irregularly longitudinally strigulose, reticulate, very finely punctured and with sparse short white hairs; temples about half the diameter of the eye, rugose; head beneath strongly but finely alutaceous, the "neck" coarsely transversely ridged and shining. *Rostrum* as long as the head and pronotum together, stout, distinctly curved, cylindrical, distinctly but weakly widened at the antennal insertion, thence parallel-sided to the apex; dull alutaceous, basally impunctate, sub-apically shallowly but distinctly, almost rugosely punctate, apically subnitid; ventrally quite smooth and shining. *Antennae* inserted at one-fifth of the length from the base of the rostrum, stout, short and of even thickness; scape short, as long as the two basal segments of the funicle taken together; proximal segment of the funicle stout, one and a half times longer than wide, nearly three times as long as the second segment which is as long as wide; third to seventh segments equal in length and breadth; club fusiform. *Pronotum* barely longer than wide (1.7:1.5), sides weakly rounded; sub-basal and sub-apical constrictions obsolete, apex barely narrower than the base; strongly and evenly punctured, the punctural interstices

equal to the diameter of the punctures, distinctly but finely microreticulate; base nearly straight; dorsal outline about equal to the lateral convexity; a distinct, sharply impressed medio-dorsal sub-basal striole or elongate fovea. *Scutellum* minute, punctiform. *Elytra* elongate-oval, the humeri very obsolete, at the sides very little rounded, almost parallel-sided about the middle; strongly and sharply striate, the striae catenate-punctate, the punctures distinct and separated from each other by a space about equal to half the diameter of the punctures; striae 1 and 2 uniting with 9 at apex; interstriae narrow, little wider than the striae, convex, sub-shining, transversely finely striolate, with an irregular, almost unilinear series of fine but distinct punctules, each bearing a fine greyish-white hair; elytral apices rectangular; dorsal outline very slightly convex anteriorly, the posterior declivity abrupt. *Venter* quite dull, alutaceous, strongly, deeply and evenly punctured, the punctures separated from each other by a space about equal to their diameters; fifth ventrite not clearly visible but it appears to be largely rounded, not transverse. *Legs* short, the hind femora not exceeding the base of the fifth ventrite; anterior tibiae simple; tarsi quite short and not wider at the bilobate third segment; the basal segment of the hind tarsi rather deep and developed into a strong, acute termino-ventral spine, the second segment also rather deep but simple; segments of the intermediate tarsus simple; claws short, simple.

Length: 2.20 mm. (*sine rostro*). Width: 0.87 mm.

Holotype ♂, EAST TIBET: Lhodzong, Poshō, 12,600 ft., 15.v.1936 (R. J. H. Kaulback coll.). Unique!

This species belongs to the so-called subgenus *Ceratapion* Schilsky, characterised by the nearly uniform thickness of the antennal funicle, the almost cylindrical pronotum, the dilation of the rostrum at the antennal insertion and the sharp tooth on the basal segment of the hind tarsus of the males. The specimen runs to the *perlongum-macrorhynchum* couplet of Schilsky's key (Kuster-Kraatz, 1906, *Käf. Eur.* 43 : xxi) both of which were described on unique females. A third species, *sejugum* Desbr., synonymised with *macrorhynchum* by Wagner (1908, *Ent. Blatt.* 4 : 104) was also based on a unique female. *A. tibetanum* differs from these species by the irregularly unilinear interstitial punctures of the elytra and from *perlongum* by the punctate rostrum. It must also be close to *opacinum* Fst. from Eastern Siberia, but the rostrum of that species is also said to be impunctate and the interstitial punctures very obsolete.

Apion hingstoni sp. n.

♂. Derm black, scape of antenna rufo-flavous, elytra feebly metallic blue-black, clothing scanty, white; rostrum curved, weakly attenuate to the apex; eyes large, beneath with moderately dense white hairs; pronotum strongly reticulate, strongly but shallowly punctured, the punctures reticulate; scutellum very small; elytra ovate, humeri not very pronounced; striae strongly impressed, catenate-punctate; interstriae flat, one and a half times as wide as the striae, transversely striolate with a unilinear series of fine punctures; legs long and slender; basal segment of the four hind tarsi with a strong acute termino-ventral spine; claws long, sharply bent at the base and with a distinct acute sub-basal ventral tooth.

Head as long as wide; eyes moderately prominent, regularly rounded; frons flat, as wide as the base of the rostrum, very obsoletely longitudinally bisulcate, very strongly alutaceous or shagrinata; vertex obsoletely rugose owing to the large shallow reticulate punctures; temples half the diameter of the eye, shagrinata; beneath the eye densely punctate or rugose; frons and vertex sparsely clothed with white hairs or very narrow scales; circum-orbital hairs pronounced; beneath the eye moderately densely clothed with white hairs or narrow scales with truncate apex. *Rostrum* longer than the pronotum but not as long as

the head and pronotum taken together, curved, cylindrical, stout and nearly parallel-sided from the base to the antennal insertion, thence to the apex weakly but visibly attenuate; basally alutaceous, very obsoletely punctate, the dorsal punctures forming a series on either side of the middle line and appearing as a shallow sulcus; beyond the antennal insertion distinctly, finely and fairly closely punctured, surface between the punctures smooth and shining, the interstices of the punctuation being two to three times the diameter of the fine punctures; basi-laterally obsoletely sulcate, alutaceous. *Antennae* inserted at one-quarter of the length from the base of the rostrum, moderately long and slender; scape long, as long as the four basal segments of the funicle taken together, rufo-flavous with the apex lightly infuscate; basal segment of the funicle ovoid, one and a half times longer than wide and not longer than the second segment; third to seventh segments sub-equal in length but very slightly broader towards to apex, seventh as long as wide; club short oval, basal segment as long as the second and third taken together and twice as long as wide. *Pronotum* as long as wide, widest at the base, sub-basal constriction almost obsolete, sub-apical very strongly marked; sides to middle nearly parallel, thence abruptly attenuate to the sub-apical constriction; apex strongly rim-like; strongly alutaceous, dull, closely, evenly and largely punctured but very shallowly, the punctures alutaceous; the surface vaguely rugose owing to the closeness of the punctures, each of which bears a moderately long fine white hair; sub-basal medio-dorsal fovea very fine and shallowly but sharply impressed. *Scutellum* very small, triangular, not longer than wide and slightly inflated. *Elytra* ovate, humeral callus not particularly prominent; dorsal outline moderately highly convex, highest at middle; strongly, sharply and deeply striate, the striae catenate-punctate, the punctures excentric, the space between neighbouring punctures nearly twice the diameter of the punctures; striae rather deeply impressed at base, the base apparently slightly carinate; stria 1 uniting with 9, stria 2 with 7 and 8 at the apex; interstriae flat, one and a half times the width of the striae, transversely distinctly striolate, dull, with a unilinear series of fine punctures, each bearing a short, curved, semi-erect white hair; apices rounded rectangular; sides moderately rounded, widest at middle. *Venter* reticulate, metasternum with a few obsolete punctures laterally; apparent first, second and fifth sternites rather strongly punctured; anterior edge of procoxae and mesosternal episterna with moderately dense white hairs, the remainder of the surface sparsely similarly clothed. *Legs* long and slender, hind femora not quite reaching the apex of the abdomen; tarsal segments long, second nearly twice as long as wide at the apex; proximal segment of the four hind tarsi developed into a stout, acute termino-ventral spine; claws long, abruptly bent at the base, with an acute sub-basal ventral tooth.

Length: 2.67-2.88 mm. (*sine rostro*).

Holotype ♂, TIBET: Rongshar Valley, 10,000 ft., 26.vi.1924 (*Maj. R. W. G. Hingston* coll.) (1924 Mt. Everest Expedition); *Paratype* ♂, same particulars.

This species appears to belong to the *ervi*-group but is not particularly close to any of those named in the British Museum or any others of which I have been able to see the original descriptions. It must remain as a rather isolated species until further material from West China and the Himalayas can be studied.

All the material described above is in the British Museum (Natural History).

DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA)¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

Staphylinus (Abemus) marginatus sp. n.

Head and thorax bronze green, the latter with the side margins, base and middle of the anterior border narrowly reddish-yellow: elytra black, the suture, posterior margin and sides narrowly reddish-yellow: abdomen smoky brown, the raised side margins reddish-yellow, with brown bifariate pubescence on the first five visible tergites with small patch of short golden-yellow pubescence in the middle. Antennae dark brown, the 1st segment and legs reddish-yellow, the femora black below. Length 16 mm.

Apparently near *circumcinctus* Bernh. Head subquadrate, temples parallel, shorter than the eyes, closely covered with small umbilicate punctures and long close golden-yellow pubescence. Antennae short with transverse penultimate segments. Thorax transverse, at the middle of the base with small shining plaque, the sculpture and pubescence as on the head. Elytra as long as the thorax, coriaceous, scarcely punctured, the pubescence as on the thorax, scarcely marmorate. Abdomen coriaceous, scarcely punctured, the pubescence as on the fore-parts.

♂. 5th sternite with small obtuse emargination; 6th with rather deep arcuate emargination, its edges membranous.

BENGAL: Kalimpong, Samsingh, altitude 1800 feet. Unique. My collection.

Staphylinus (Ocypus) bicolor sp. n.

Rather shining, black, the elytra red, the extreme base narrowly blackish. Antennae and legs black, the last two segments of the former reddish. Length 17 mm.

In build similar to *globulifer* Geoff. but with shorter antennae, the puncturation of the head and thorax finer, the elytra red. ♂. Head transversely subquadrate, slightly broader than the thorax, the post-ocular region rounded with the base and about as long as the eye, on the vertex with a short narrow impunctate space, elsewhere closely and distinctly less coarsely punctured than in *globulifer*. Antennae with the penultimate segments about as long as broad. Thorax a little longer than broad, distinctly narrowed behind, along the middle of the posterior half with a narrow impunctate line, elsewhere as closely but less coarsely punctured than the head. Elytra as long as the thorax, very similarly punctured and covered with long golden pubescence. Abdomen closely, moderately finely punctured, the pubescence black. 6th sternite narrowly and deeply excised.

PUNJAB: Lyallpur, 23.vi.39 (*M. A. Gham*). Unique. In the British Museum (Natural History).

Ontholestes assamensis sp. n.

Black, dull: base of the scutellum with some golden hairs, the elytra mottled with golden and black pubescence: abdomen with the first two visible tergites each with a small triangular spot of golden pubescence at the middle of the base, at each side with a larger patch of similar colour; 3rd with small median basal spot of silvery pubescence and at the sides with a few silvery hairs; 4th with a patch of silvery pubescence on each side at the base; 5th with transverse basal fascia of silvery hairs. Antennae and legs black. Length 12 mm.

¹ Continued from 1943, *Proc. R. ent Soc. Lond.* (B) 12: 132.

Size and build of *aurosparus* Fauv., the antennae similarly constructed but at once distinguished by the entirely black antennae and legs, the entirely black and not variegated head and thorax and the elytra being entirely golden and black without silvery pubescence : the pubescence of the abdomen scarcely differs from that of *aurosparus*.

ASSAM : Shugan, altitude 3000 feet. Type in my collection.

Philomyeta gen. nov. Xanthopygi.

Facies much resembling *Philothalpus* but readily recognised by the abdominal characters. Head orbicular or transversely suborbicular. Labrum short, transverse with well-developed membranous margin with small rectangular emargination in the middle. Mandibles long and slender, falciform, edentate, obtusely angulate a short distance before the base. Maxillary palpi long, filiform, the 1st segment short, 2nd elongate, curved, gradually and distinctly thickened towards the apex, 3rd a little shorter than the 2nd, 4th distinctly longer than the 3rd, pointed. Inner lobe of maxilla broad, densely ciliate, the outer much narrower and densely ciliate. Mentum strongly transverse, trapezoidal. Tongue very small and short, triangular with a small notch at apex. Paraglossae well developed. Labial palpi elongate, filiform, the 1st segment about half as long as the 2nd, 3rd a little shorter than 2nd, gradually thickened towards apex and pointed. Pronotum with the superior curved line but little deflexed, meeting the inferior at the anterior margin; prothoracic stigma exposed. Mesosternum pointed, extending about half the length of the coxae and separated from the rounded apex of the metasternum by a short intersternal piece, the coxae moderately separated. Legs rather long, the middle tibiae with a few spines externally. Anterior tarsi dilated in both sexes, more strongly in the ♂; middle and posterior elongate, slender, the 1st segment rather long, the 2nd to 4th gradually decreasing in length. Abdomen a little narrowed towards the apex, the first four visible tergites each with a transverse impression at the middle of the base limited on each side by a short keel. The species occur in fungus.

Type of the genus the following species :

Philomyeta caeruleipennis sp. n.

Head, thorax and scutellum black, dull, elytra and abdomen more shining, the former deep blue, here and there with purple reflex, the latter black with the posterior margin of the 5th visible tergite and whole of the 6th bright yellow. Antennae with the 1st segment reddish-brown, the last four yellow, the intermediate black. Legs yellowish-red. Length 10-11 mm.

Head transverse, suborbicular, broader than the thorax, the eyes moderate, closely covered with moderate umbilicate punctures. Antennae of moderate length, the 3rd segment longer than the 2nd, 4th to 9th all longer than broad, decreasing in length, the 10th as long as broad. Thorax longer than broad (6.5 : 5.5), broadest at the rounded anterior angles, the sides from thence straight and distinctly retracted to the rounded posterior angles, in the middle a little before the base sometimes with trace of short shining line, the sculpture as on the head. Scutellum closely punctured, rugulose and coriaceous. Elytra longer (8 : 6.5) and broader than the thorax, rather finely, closely and roughly punctured, rather closely pubescent. Abdomen a little narrowed towards the apex, rather closely and less finely punctured at the bases of the tergites, more finely but equally closely elsewhere. Head and thorax with very fine, scanty pubescence, abdomen with fine but much closer pubescence.

♂. 6th sternite with broad arcuate emargination.

DARJEELING : Ghum district. Type in my collection.

Philomyceta affinis sp. n.

Very similar to *caeruleipennis* Cam. but at once distinguished by the black legs and also differs in the following respects: the head and thorax are not so dull, the former less transverse and with a shining plaque on the vertex, the elytra with greenish reflex at the base and apical margin, in other respects similar.

DARJEELING: Ghum district. Type in my collection.

Algon excellens sp. n.

Rather shining; head and thorax dark violet, elytra bright blue; abdomen black. Antennae with the 1st segment pitchy, the following reddish. Legs black. Length 15 mm.

Readily recognised by the colour. Head transverse, suborbicular, narrower than the thorax, eyes large, temples short, the posterior angles obtuse, the base obliquely retracted to the neck; very sparingly and finely punctured except at the base which is coarsely and rugosely punctured. Antennae with the 3rd segment longer than the 2nd, 4th to 10th all longer than broad, decreasing in length. Thorax slightly broader than long, convex, the sides evenly rounded, more retracted towards the front, all the angles rounded, the puncturation very fine and scattered as on the head. Scutellum black, closely punctured. Elytra as long but scarcely as broad as the thorax, rather closely, moderately coarsely punctured. Abdomen a little narrowed towards apex, rather finely and moderately closely punctured and with greyish pubescence. Fore-parts without ground sculpture, that of the abdomen very fine and transverse.

♂. 6th sternite with narrow, rather deep arcuate emargination.

ASSAM: Shillong, altitude 6000 feet. Unique. My collection.

Quedius (s.str.) kashmirensis sp. n.

Shining, black, the elytra blue, abdomen somewhat iridescent. Antennae and legs black. Length 9 mm.

Head orbicular, narrower than the thorax, eyes large, about three times as long as the post-ocular region. Labrum truncate, along the middle with impressed line; median inter-ocular punctures a little further from each other than from the lateral, behind the eye with three or four small punctures; ground sculpture fine and wavy, more or less transverse. Antennae long, the 3rd segment longer than the 2nd, 4th to 7th longer than broad, decreasing in length, 8th to 10th as long as broad. Thorax slightly transverse (6.5 : 6), narrowed towards the front, on each side before the middle with three punctures placed obliquely, the ground sculpture as on the head. Scutellum impunctate. Elytra longer (8 : 6) and broader than the thorax, moderately finely and moderately closely punctured, finely pubescent; ground sculpture absent. Abdomen narrowed towards the apex, more finely but about as closely punctured on the anterior segments as the elytra, more sparingly behind, the pubescence rather long and with a few longer setae: ground sculpture very feeble.

KASHMIR: Gulmarg. Unique. My collection.

Quedius (Microsaurus) flavocaudatus sp. n.

Shining, head and thorax black, elytra red, abdomen black, iridescent, the last two tergites reddish-yellow. Antennae black, the last four segments pale yellow. Legs dark, tarsi reddish-yellow. Length 12 mm.

In build very similar to *lateralis* Gr. but with broader head. Head almost as broad as the thorax, the curvature of the eye as long as the rounded post-ocular region, behind the eye with two large punctures, elsewhere with an extremely fine scattered puncturation, the

ground sculpture fine, transverse, wavy. Antennae extending nearly to the base of the thorax, 3rd segment longer than 2nd, 4th slightly longer than broad, 5th to 10th scarcely differing, as long as broad. Thorax transverse, the sides rounded, more retracted in front, obliquely impressed postero-laterally, on each side of the middle in the anterior half with four large punctures, the sculpture as on the head. Scutellum black, impunctate, the base finely wrinkled. Elytra a little longer than the thorax, closely, rather coarsely punctured and without ground sculpture. Abdomen very finely, moderately closely punctured, the ground sculpture extremely fine, transverse.

♂. 6th sternite with small triangular impression at the middle of the posterior border, its base emarginate.

UNITED PROVINCES : Naini Tal, altitude 6000–8000 feet. Unique. My collection.

***Quedius (Sauridus) deceptor* sp. n.**

Shining, black, the elytra bronze green. Antennae and legs black. Length 7 mm.

Very similar to *chatterjeei* Cam. in general appearance especially in the colour and sculpture of the elytra; it is at once distinguished, however, by the dark legs, smaller eyes, blacker abdomen, the punctures of the humeral row larger and between the rows with more numerous small punctures; in other respects like *chatterjeei*.

DARJEELING : Ghum district. Unique. My collection.

***Quedius (Raphirus) decipiens* sp. n.**

Very closely allied to *musciola* Cam. but differing in the following respects: elytra with less marked metallic reflex and obviously more finely punctured, the abdomen without tufts of golden pubescence at the sides of the tergites, the pubescence there although thicker than elsewhere of a greyish colour as on the rest of the surface and finally the posterior tibiae are black. Length 6 mm.

DARJEELING : Ghum district : Mangpu. Unique. My collection.

***Quedius (Raphirus) heterogaster* sp. n.**

In size, build, colour of antennae and body similar to *aureiventris* Bernh. but at once distinguished by the much more sparingly punctured and much more sparingly pubescent abdomen, the pubescence yellow at the sides. The legs are entirely reddish-yellow. In all other respects like *aureiventris* but the abdomen strikingly different. Length 4.75 mm.

UNITED PROVINCES : Chakrata district : Kanasar. Type in my collection.

***Trichophya kashmirica* sp. n.**

Size, build, colour and lustre of *pilicornis* Gyll. and only differing in the following respects; the punctures of the head are a little larger and deeper, the antennae similarly constructed but a little shorter, sculpture of the thorax less fine and less close, but that of the elytra and abdomen scarcely differing from *pilicornis*.

KASHMIR : Gulmarg, altitude 8000–10,000 feet. Type in my collection.

***Trichophya andrewesi* sp. n.**

Moderately shining, the head black, the rest pitchy black to pitchy brown. Antennae yellow, the 7th to 10th segments infusate. Legs yellow. Length 1.75 mm.

Narrower than *antennalis* Cam., the sculpture of the fore-parts similar in character but

finer and closer, that of the abdomen also finer. Antennae shorter and more slender than in that species but similar in structure.

Nilgiri Hills (*Andrewes*). Type in my collection.

Mimodictyon gen. nov.

Of the build of *Dictyon* Fauv. and closely related to it and also *Paradictyon* Scheerp. but differing from both in certain respects. Very small, convex, the abdomen strongly narrowed to the apex and retractile, the first three visible tergites strongly, the following very finely bordered, the 5th and 6th both much longer than the 4th, the 5th with fine white membranous posterior margin. The elytra only feebly arcuately emarginate postero-externally, the reflexed sides vertical and without keel. Head short, transverse, the base inserted in the thorax, the neck broad, the eyes small, the post-ocular region rounded and retracted to the neck. Labrum transverse, the anterior border gently rounded, finely membranous. Mandibles small, pointed, each with a sharp tooth behind the apex, the right sometimes with a second much smaller one also. Maxillary palp with four segments, the 1st very small, 2nd elongate, a little curved and thickened towards the apex, 3rd as long as the 2nd, more enlarged towards the apex, 4th subulate, half as long as the 3rd. Inner lobe of maxilla narrow, pointed, closely set with slightly curved spines, outer lobe narrow and pointed, ciliate at apex. Mentum transverse, trapeziform. Tongue short and broad with small notch in the anterior border and a long seta on each side. Labial palpi with three segments, the 1st small, as long as broad, 2nd large, oval, 3rd very narrow, elongate, distinctly longer than the 2nd. Prosternum moderately long, rounded behind, finely keeled along the middle. Pronotal epipleura small and but little developed. Mesosternum broadly, slightly arcuately emarginate in front, carinate, its process narrow and acute, meeting the anterior border of the short broad metasternum, the middle coxae narrowly separated. Metasternum broadly arcuately emarginate on each side posteriorly for the large broad flattened posterior coxae, the inner plate of which is subquadrate, contiguous with its fellow and with a small notch in its posterior margin, the outer plate large and nearly semicircular. Femora flattened, deeply sulcate for reception of the tibiae. All the tarsi 5-segmented, the anterior as long as the tibia, the first four segments short and subequal; middle as long as the tibia, the 1st segment as long as the three following together; posterior longer than the tibia, the 1st segment as long as the 2nd and 3rd together.

Type of the genus the following species:

Mimodictyon indicola sp. n.

Moderately shining, entirely reddish-yellow. Antennae, palpi and legs yellow. Length 1.3 mm. (abdomen well extended).

Head transverse, narrower than the thorax (2 : 3.5), with a few minute, scarcely visible punctures and fine yellow hairs: ground sculpture absent. Antennae short, the first two segments of equal length, stout, 4th to 7th small, slightly transverse, differing but little, 8th larger and more transverse, 9th and 10th yet larger and stouter, 11th elongate, as long as the three preceding together, so forming a stout four-segmented club. Thorax convex, transverse (3.5 : 2), the sides rounded and retracted towards the front, the posterior angles rectangular, the puncturation very fine but closer and not so fine as on the head, the pubescence similar; ground sculpture absent. Scutellum without sculpture. Elytra at the suture as long as the thorax, of equal breadth, the puncturation extremely fine, rather close, distinctly finer and closer than on the thorax and with fine reticulate ground sculpture and yellow pubescence. Abdomen with very fine, moderately close punctures, reticulate ground sculpture and yellow pubescence which is longer and less fine than on the fore-parts.

SIWALIKS : Nakraunda. In rotten wood. Type in my collection.

BOOK NOTICES.

The Butterfly Fauna of Ceylon. By L. G. O. WOODHOUSE and G. M. R. HENRY. Colombo (The Surveyor-General's Office), 1942. pp. xviii + 172. Large 4to. 51 plates, 6 text-figures. Price £1 10s.

This fine illustrated book gives coloured illustrations of all species of butterfly which have been found so far in Ceylon. Not since Moore's *Lepidoptera of Ceylon*, published in 1880-81, has the entomologist been able to find in one volume all the information he might reasonably seek on Ceylon butterflies, for Ormiston's book, published in 1924, was admittedly no more than a supplement to Moore.

The present work is intended to provide "a ready means for identifying all the butterflies, seen or captured", and the authors hope that, as one result of its publication, enthusiasm may be aroused and the life histories of all the species fully worked out. In addition to the scientific name of every species described, a popular English name is given.

For each species such information as is known concerning the early stages is given, with a description and a reference to the coloured illustrations. In addition to these last a number of black-and-white drawings of the eggs, larvae, and pupae are supplied.

Three indices are included in the book: an index of genera and species; an alphabetical index of common names; and an alphabetical list of those plants on which Lepidoptera are known to feed.

In the long introduction there is a brief history of the study of Ceylon butterflies, an elementary description of the various parts of the insects, notes on classification and nomenclature, habits, protective resemblance and mimicry, variation, distribution, and a long section giving much first-hand information on methods of collecting and preserving butterflies, a subject in which the senior author is particularly interested.

The only adverse criticism of the book is that the tissue paper intended to protect the coloured plates has been made to carry the printed explanations of the plates, a practice not conducive to ease in using the volume.

Termites (Isoptera) from the Australian Region. By Gerald F. HILL. Melbourne (Council for Scientific and Industrial Research), 1942. pp. 479, 24 pls., text illust. 8vo.

This catalogue of Australian termites is reproduced by the off-set process in imitation type-written characters, and is illustrated by twenty-four half-tone plates. The author recognises four families, twenty-five genera and subgenera. one hundred and ninety-three species and eight subspecies, of which thirty-two species are described as new.

The book is systematically arranged under species, reference being made to the original description, and the synonymy is given where necessary. A description of the winged adult and the soldier is given for 170 of the species, including a small number of cases where these castes are described for the first time.

NEW SOUTH AFRICAN APIONINAE (COL., CURCULIONIDAE)

By J. BALFOUR-BROWNE, M.A., F.Z.S., F.R.E.S.

*Dept. of Entomology, British Museum (Natural History).***Apion micans** sp. n.

♂♀. Derm black, slightly metallic; antennae and legs, with the exception of the coxae, rufo-flavous; setose scales of elytral striae adpressed, of interstriae erect, white; meso-sternal episterna and epimera and metasternal epimera densely clothed with broader adpressed clear white scales; claws sharply dentate ventrally at the base.

Head as wide as long, the eyes prominent, strongly rounded; beneath moderately closely clothed with broad white scales which are continued on to the venter of the "neck"; frons as wide as the base of the rostrum, flat, with a short median shallow stria and four longitudinal rows of punctures each bearing a scale; temples about one-quarter the diameter of the eye, rugose punctate, the punctures each bearing a scale. *Rostrum* of the male about as long as the pronotum, cylindrical, stout, obsoletely dilated at the antennal insertion, otherwise approximately parallel-sided, distinctly but quite finely punctured, basally microreticulate between the punctures, apically smooth and shining, at the median third slightly rugose; very slightly but distinctly curved; near the apex ventrally flat with a few punctures; of the female as long as the head and pronotum together, cylindrical, weakly curved, more slender, particularly after the antennal insertion to the apex, sculptured similarly to that of the male but the punctures are finer and sparser towards the apex. *Antennae* rufo-flavous, inserted at about one-quarter of the length of the rostrum from the base, quite slender; scape twice as long as the basal funicular segment, which is about one and a half times as long as wide and twice as long as the second segment, third to seventh segments subequal in length but progressively broader, seventh distinctly transverse; club oval; all segments with white setae. *Pronotum* as long as wide, widest at the middle, base and apex of equal width; dorsal outline very weakly convex; with large, shallow punctures, each bearing a setose scale, the punctural interstices about equal to the diameter of the punctures, microreticulate; with a short but sharply impressed median dorsal sub-basal fovea; anterior margin with a "collar" of forward-projecting scales; anterior face of the procoxae of the male densely clothed with broad, pure white scales, of the female with narrow scales. *Scutellum* very small, semicircular. *Elytra* elliptical, widest about the middle, dorsal outline not very strongly convex, highest at middle; humeral callus distinct; striae strongly and sharply impressed, with the catenulate punctures very distinct, each space between neighbouring punctures with a small adpressed setose scale; interstriae flat, on the disc not wider than the striae, with a single row of erect setose scales; striae 1 and 2 uniting with 9 at apex; surface slightly metallic, moderately shining; elytral apices rectangular. *Venter* with regular, evenly spaced punctures each bearing a narrow setose scale but those of the metasternum and sides of apparent basal ventrite broader, more scale-like. *Legs* rufo-flavous, slender but short; metafemora not nearly attaining the apex of the abdomen; male with an interno-apical spur on the four posterior tibiae; apparent fourth tarsal segment of the four posterior tarsi short, not, or barely longer than the proximal segment; claws black, finely but distinctly dentate at the base beneath; all femora and tibiae clothed with white setae.

Length: 1.9-2.3 mm. (*sine rostro*).

PROC. R. ENT. SOC. LOND. (B) 13. PTS. 3-4. (APRIL 1944.)

c

Holotype ♂, CAPE PROVINCE: Mossel Bay, x.1921; *Allotype* ♀, same particulars; *Paratypes*, 4 ♂♂, 2 ♀♀, same particulars; 4 ♂♂, same locality, vi.1924.¹

This little species appears to belong to the subgenus *Phrissotrichum* Schilsky by the presence of erect scales in the interstriae and recumbent scales in the striae, but the rostrum is weakly but distinctly curved and not markedly elongate as in *tubiferum* Gyll., the subgenotype. The flavous legs and unilinear interstitial scales place the new species near *A. crinitum* Wagn., which must also be included in the subgenus. The new species may be distinguished by the entirely black rostrum of the male, the shorter striaal scales, the shorter and curved interstitial scales and by the distinctly reticulate interspaces between the thoracic punctures.

Apion rubiginosum sp. n.

♂♀. Derm testaceous, antennae and legs flavo-testaceous; scales of the elytral striae adpressed, of the interstriae erect with the apex recurved, cream-coloured; scales of the legs porrect; venter not densely but rather sparingly clothed with white scales; claws stout with a large blunt ventral basal tooth.

Head as wide as long, the eyes not very prominent, flatly rounded; beneath the eyes with rather copious cream scales; frons as wide as the base of the rostrum, flat, shining with two rows of fine punctures on either side of the middle line, each puncture bearing a porrect, curved, cream scale; each margin against the eye with closely set punctures, each bearing a cream scale; temples linear; surface shining, non-reticulate. *Rostrum* of the male as long as the pronotum alone, of the female as long as the head and pronotum together, fairly stout, weakly arcuate, parallel-sided and of equal width throughout, with a few fine and scattered punctures; shining and non-reticulate between the punctures; at each side from the base to the antennal insertion a few stronger punctures, each bearing a scale, are aggregated into an impressed line and the admedian rows of punctures of the frons continue on to the base of the rostrum up to about the antennal insertion. *Antennae* rather short, inserted at one-quarter of the length of the rostrum from the base; scape rather elongate, about as long as the first four segments of the funicle taken together, slender; basal segment of the funicle twice as long as wide and twice as long as the second segment, third to seventh segments progressively broader; club ovoid, about as long as wide at the basal segment, which is the widest. *Pronotum* as long as wide, widest at the base, the sides almost straight, gradually attenuate to the apex, which is about two-thirds the width of the base; dorsal outline very weakly convex; rather strongly but evenly punctured, the punctures separated from each other by a space about equal to half the diameter of the punctures, the surface sub-shining, very finely obsolete microreticulate; each puncture bearing a curved semi-procumbent cream-coloured scale; sub-apical constriction obsolete; no dorsal sub-basal fovea, at the most only a shallow, barely discernible depression in the normal position of the fovea. *Scutellum* short, oval, about one and one-half times longer than wide at the base. *Elytra* elliptical, widest at middle; dorsal outline strongly convex; highest at middle, the posterior declivity steep; humeral callus distinct; striae strongly impressed, catenulate punctate, each space between neighbouring punctures with an adpressed setose scale; interstriae convex, about one and one-half times wider than the striae on the disc, with a single row of porrect, curved cream-coloured scales; the suture behind the scutellum with a short patch of procumbent white scales; stria 1 uniting with 9 at apex; apices rectangular, not rounded. *Venter*, particularly metasternum and apparent first and second ventrites, strongly punctured, the punctures separated by about half their diameters, each bearing a narrow curved white scale. *Legs* rather short, the hind femora not quite reaching the

¹ The collector, in all cases, for the species described in this paper is R. E. Turner and all the material is in the British Museum (Natural History).

apex of the body, flavo-testaceous, clothed with straight, porrect, spatulate white scales; claws black with a strong blunt basal ventral tooth; middle and hind tibiae of the male unarmed at the interno-apical angle.

Length: 1.83-2.07 mm. (*sine rostro*).

Holotype ♂, PONDOLAND: Port St. John, 12-30.vi.1923; *Allotype* ♀, same locality, 1-9.vii.1923; *Paratypes*, 1 ♂, 6 ♀♀, same locality, 12-30.vi.1923 (2); 1-9.vii.1923 (2); 10-31.vii.1923 (1); 15-31.v.1923 (1); x.1923 (1).

This species is rather similar superficially to *A. russeolum* Gyll. but may be immediately distinguished by the porrect unilinear scales of the interstriae and the shining interstices of the head and rostrum. Except for *A. crinitum* Wagn. and *A. micans* sp. n., I know of no related species and they may be distinguished from *rubiginosum* by the black colour of the derm and the dense white clothing of the thoracic venter. This species must be included also in the subgenus *Phrissotrichum* Schilsky on the character of the scales of the elytra, but as in the two other South African species the rostrum is not markedly elongate and is distinctly if weakly curved.

Apion baccatum sp. n.

♂♀. Derm black, shining; antennae fusco-rufous, the club rufous; legs with the femur and tibia rufous, the trochanter and tarsi rufo-fuscous and the coxae black; scales adpressed, lanceolate, short, of a pearly lustre, in a single row in the striae, irregularly bilinear on the interstriae, densely set on the thoracic venter; claws short, with a short blunt basal tooth.

Head about as long as wide, the eyes not prominent, flatly rounded; frons as wide as the base of the rostrum, flat, with obsolete longitudinal striae, finely microreticulate with two longitudinal series of scale-bearing punctures on either side of the middle line and irregular scale-bearing punctures along the eye margin; temples extremely short; the eyes fringed with scales. *Rostrum* in the male shorter than the head and pronotum together, parallel-sided to the antennal insertion, then abruptly narrowed and thence parallel-sided to the apex; basally finely microreticulate and vaguely linear punctate, apically smooth and shining with very fine scattered punctules; black to the antennal insertion, thence rufescent to the apex, which is fusco-rufous; in the female as long as the head and pronotum together, the apex about two-thirds the width of the base, regularly attenuate from base to apex; basally reticulate, with scattered punctures, progressively more finely punctate towards the apex, the reticulations not extending farther than the antennal insertion, black throughout. *Antennae* rather short in the male, the scape not longer than the first and second segments of the funicle taken together, in the female longer, the scape as long as the first three segments of the funicle taken together, the club in both sexes rufous, oval, the funicular segments barely wider at the apex than at the base. *Pronotum* a little longer than wide, widest at the base, approximately parallel-sided from the base to the middle, thence attenuate to the ante-apical constriction which is fairly well marked; dorsal outline weakly convex; base obsoletely bisinuate; punctuation fairly dense and well-impressed, the interstices obsoletely microreticulate; a deep median sub-basal dorsal fovea; the surface well clothed with lanceolate pearly-lustred scales. *Scutellum* very small, rounded. *Elytra* about twice as long as wide at the base; the humeral callus distinct but not prominent; the sides subparallel to about the middle, thence evenly attenuate to the apex; dorsal convexity even and moderate; the striae sharply but not deeply impressed, the striae punctures markedly catenulate, the intervening area about the diameter of the punctures and with a single elongate-oval scale to each; interstriae almost flat, about one and a half times the width of the striae on the disc, the first, third, fourth and eighth irregularly bilinear, the second, fifth, sixth and seventh irregularly trilinear, the sutural

with a single row of elongate-oval scales; the apex of the elytra of the male more evenly and largely rounded than in the female. *Venter* black, densely and evenly clothed with rather bat-shaped scales, particularly so on the meso- and metathoracic segments. *Legs* rather short but slender, the hind femora not attaining the elytral apices; the coxae black, trochanter and tarsi rufo-fuscescent, the femur and tibia rufous, clothed with narrow elongate white scales; the claws black, with short basal ventral tooth; the four hind tibiae of the male with stout black interno-apical spur.

Length: 1.97-2.37 mm. (*sine rostro*).

Holotype ♂, SOUTH-WEST AFRICA: Aus, xii.1929; *Allotype* ♀, same locality, 8-30.xi.1929; *Paratypes*, 2 ♀♀, same particulars as allotype ♀; SOUTH AFRICA: 1 ♂, 1 ♀, Camps Bay, Cape Peninsula, ix.1920; 1 ♀, Lion's Head, Capetown, 2-11.vi.1920; 1 ♀, Mossel Bay, Cape Province, x.1921; 1 ♀, Cape Province, Ceres, ii.1925; NATAL: 1 ♂, Van Reenen, Drakensberg, xii.1926.

The exact relationships of this species are not clear. It appears to have certain features in common with the *A. montivagum* Wagn. and *A. arrowi* Wagn. group except for the black derm and it also appears to have some connection with *A. squamulatum* Gyll. There are other species related to *baccatum* in Turner's material from South Africa which have yet to be worked out and the nearest related species may possibly be found among these.

Apion turneri sp. n.

♂♀. Derm rufo-testaceous, the base of the rostrum and the coxae pitchy; surface with opalescent or nacreous short oval scales, only the rostrum from the antennal insertion to the apex and a transverse band on the disc of the elytra without scales.

This species is so extremely similar to *A. montivagum* Wagn. from Table Mountain, that a separate description seems to be unnecessary. The pronotum is narrower and slightly more distinctly longer than wide, the elytra are more elongate, laterally more distinctly rounded and the humeral callus a little more distinctly prominent, but in one female of the series the callus is quite undeveloped, the sides of the elytra evenly wider from the base to the median widest part. The form is more that of *A. arrowi* Wagn., also from the Cape Province, but the pronotum is narrower and the scaled area of the elytra is much more extensive. The new species is almost exactly intermediate in size between the two compared species and it was not until males of each had been dissected that it could be said with certainty that there was a third member of this remarkable group. The aedeagus of a co-type of *montivagum* (fig. 1, c) is rather strongly curved, almost the same width throughout and the apex rounded smoothly; that of *turneri* is much less curved, much broader, nearly parallel-sided for four-fifths of the length, thence evenly attenuate to a sharply rounded apex (fig. 1, b), the whole organ nearly twice as stout as that of *montivagum*; that of *arrowi* is about as wide as that of *turneri*, more strongly curved and the apical attenuation is less pronounced, the apex being much more bluntly rounded (fig. 1, a).

Length: 2.13-2.27 mm. (*sine rostro*).

Holotype ♂, CAPE PROVINCE: Mossel Bay, viii.1930; *Allotype* ♀, same locality, ix.1921; *Paratypes*, 2 ♂♂, 3 ♀♀, same data as allotype ♀.

Apion rubellum sp. n.

♂♀. Derm reddish-testaceous throughout; clothing of short adpressed cream-white lanceolate scales in a loose pattern, with an elongate patch of conspicuously white scales along the suture behind the scutellum; rostrum distinctly curved; claws simple; legs short.

Head distinctly wider than long (2.0 : 1.3), the eyes very prominent; the surface strongly and closely punctured, each puncture giving rise to a curved lanceolate cream-coloured scale, the eye-margin scales more distinct; punctural interstices microreticulate; beneath the eye in both sexes heavily scaled. *Rostrum* of the male as long as the pronotum, of the female as long as the head and pronotum taken together, moderately stout and of even width throughout, as wide as the frons, finely and evenly but sparingly punctured, at the base up to the antennal insertion microreticulate, the punctures here each bearing a

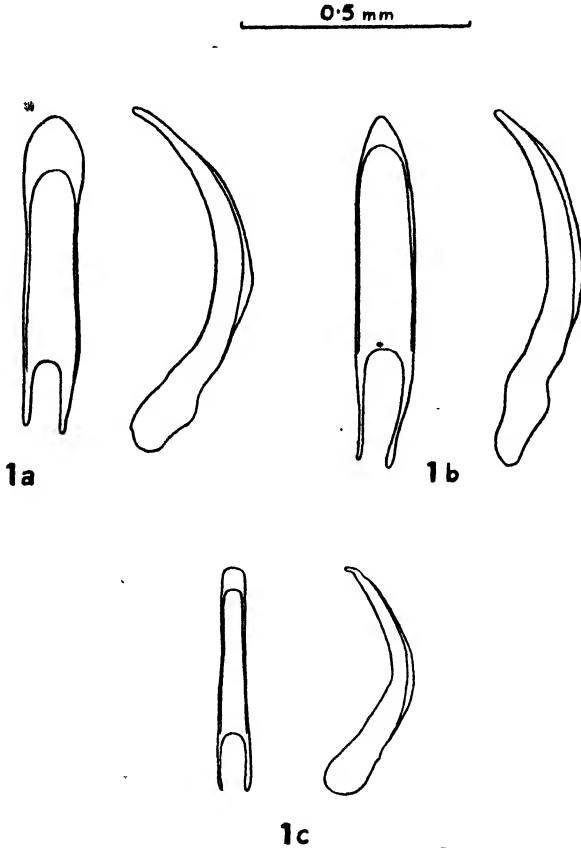


FIG. 1.—Ventral and lateral views of the aedeagus of (a) *Apion arrowi* Wagn.; (b) *A. turneri* sp. n.; (c) *A. montivagum* Wagn.

cream-coloured scale, apically smooth and shining; baso-laterally with an impressed row of punctures. *Antennae* inserted at about one-third of the length from the base of the rostrum in the male, one-quarter in the female, the scape as long as the four basal segments of the funicle taken together, the proximal funicular segment oval, nearly one-quarter the length of the scape, barely wider than the second segment which is about half its length; third to seventh segments progressively shorter; club ovoid. *Pronotum* shorter than wide, widest at the base, the sides weakly curved, the sub-apical constriction obsolete; closely, as strongly as the head, and evenly punctured, the interstices of the punctuation microreticulate; median dorsal sub-basal fovea obsolete; each puncture bearing a cream-white, narrowly lanceolate curved scale-hair; dorsal outline weakly convex; the anterior margin

with a close-set fringe of narrow scales; apex rather less than two-thirds the width of the base. *Scutellum* twice as long as wide, parallel-sided, dorsally obsoletely longitudinally grooved, the apex rounded, surface microreticulate. *Elytra* ovoid, humeral callus well developed; sides to the middle sub-parallel, thence to the apex evenly attenuate; apices rounded-rectangular in both sexes; strongly and deeply striate, the striae sharply punctured, each puncture separated from its neighbours by a space about equal to its diameter which bears a short oval cream-white scale; striae 1 and 2 uniting with 9 at apex; interstriae flat, little wider than the striae, with short, lanceolate cream-white scales in an irregular loose pattern, unilinear at the base, trilinear on the disc, not grouped into a conspicuous tuft at the base of the third interstria; the sutural margin immediately behind the scutellum with an elongate patch of conspicuously white scales, followed by a bare patch of about equal length which attains the highest point of the anterior-posterior convexity; highly convex, the convexity regular in both anterior-posterior and transverse planes. *Venter* coarsely punctured, each puncture scaliferous; the anterior face of the procoxae, the mesosternal epimera and the metasternal episterna more densely clothed. *Legs* short and stout, the hind femora not exceeding the base of the apparent fifth ventrite; middle and hind tibiae of the male without an interno-apical spur; second and third segments of the tarsus not longer than wide, apparent fourth segment short, not longer than the second and third segments taken together; claws black, simple and without basal ventral tooth; legs well clothed with narrow spatulate white scales; the interno-apical setae of the tibiae smoky-gold.

Length: 2.13–2.46 mm. (*sine rostro*).

Holotype ♂, SOUTH-WEST AFRICA: Aus, 8–30.xi.1929; *Allotype* ♀, same particulars; *Paratypes*, 4 ♂♂, 1 ♀, same particulars; 1 ♀, same locality, xii.1929; 1 ♂, same locality, i.1930.

***Aplon rubellum* subsp. *fuscomarginatum* subsp. n.**

South African material differs from the South-West African material in having the dorsum of the rostrum in both sexes very distinctly reticulate at the base, obsoletely so, but usually quite distinctly, beyond the antennal insertion which in the material from Aus is quite smooth and shining; the elytral suture and entire venter is darker in material from South Africa, but the aedeagus of both forms has been compared and the above differences do not appear to have a specific value. The South African material is regarded as being no more than a geographical subspecies of *rubellum*, for which the name *fuscomarginatum* is proposed.

Length: 1.96–2.23 mm. (*sine rostro*).

Holotype ♂, SOUTH AFRICA: Cape Province, Worcester, ix.1928; *Allotype* ♀, same particulars; *Paratypes*, Cape Province, Mossel Bay, 8 specimens, x.1921; 1–14.xi.1921; 18–30.xi.1921; xii.1921; i.1922; ii.1922; Milnerton, 2 specimens, 14–28.xii.1925; 1 specimen, i.1926; Worcester, 3 specimens, ix.1928; 1 specimen, 17–31.viii.1928.

This little species, and particularly its subspecies, are very closely related to *tropicum* Htm. (*vide* Balfour-Browne, 1944, *Ann. Mag. nat. Hist.* (11) 11:135) and only separable with difficulty therefrom. The conspicuous patch of white scales behind the scutellum, the broader and more abruptly impressed elytral striae with the punctures therein larger and deeper, the flat interstriae, the broader frons—quite as wide as the base of the rostrum—and the more finely punctured apical half of the rostrum serve to distinguish the new species and its subspecies from *tropicum*.

Apion johannis sp. n.

♂♀. Derm testaceous, the elytral suture and basal two-thirds of the side margins somewhat fuscous; the legs and apex of the rostrum of the male rufo-flavous or flavous, the apex of the femora infusate; eyes moderately prominent; scutellum elongate; claws distinctly toothed at base ventrally; margins of the ventral sclerites infusate.

Head slightly wider than long, eyes moderately prominent, temples very short; frons about two-thirds of the width of the base of the rostrum, flat, reticulate, with a pair of irregular linear series of strong punctures on either side of the middle line and the usual circumorbital punctures, each bearing a whitish-golden hair-like scale; the sides of the head below the eyes densely clothed with similar scales. *Rostrum* of the male as long as the pronotum, of the female very slightly longer, stout, cylindrical, curved; dorsally more finely and sparingly, laterally decidedly more coarsely and copiously (and vaguely linearly) punctate, the punctures not diminishing towards the apex; distinctly reticulate at the base, fading out about the middle of the length, the apex smooth and shining; the frontal series of punctures extending over the base of the rostrum to about the antennal insertion and bearing hair scales; the punctures of the apical half of the rostrum bearing short and fine but quite distinct hairs; of the male rufo-flavous or flavous from the antennal insertion to the apex, of the female testaceous throughout. *Antennae* of the male inserted at one-quarter, of the female at one-third, of the length from the base of the rostrum, flavo-testaceous, short but slender; the scape twice in the male, two and a half times in the female, longer than the proximal segment of the funicle, which is twice as long as wide; third to seventh segments progressively shorter; club fusiform. *Pronotum* a little wider than long, widest at the base, the sides nearly straight, in form a truncate cone; dorsal outline weakly convex; finely and sparingly punctured, distinctly microreticulate; each puncture bearing an elongate lanceolate whitish-gold scale, the punctures absent from a narrow medio-dorsal line running the whole length of the pronotum; anterior margin with adpressed lanceolate scales, basal margin with anteriorly directed elongate lanceolate scales set rather closer together than the general surface scales. *Scutellum* elongate, parallel-sided, apex rounded, surface rather evidently convex. *Elytra* short oval, distinctly striate, the interstriae one and a half times wider than the striae, convex; the striae catenate punctate; the interstriae basally and apically uniseriate, discally biseriately set with fine punctures bearing an elongate-lanceolate whitish scale, the base of the second interstria with a conspicuous tuft of lanceolate scales; humeral callus not very pronounced; dorsal outline evenly but not highly convex; the seventh, eighth and ninth striae are obsoletely striate about the middle, more seriate punctate; first stria uniting with ninth at apex, second with seventh and eighth. *Venter*: epimera and episterna of mesosternum and metasternal episterna rather densely clothed with white hair scales; metasternum very finely, apparent first and second ventrites more coarsely punctured but not copiously so; fifth sternite flavous. *Legs* moderately long and slender, hind femora not quite reaching the apex of the abdomen; flavous, the apices of the femora slightly infusate; tarsal segments short and broad, the first and fifth subequal, the second as long as wide; claws strong, sharply and distinctly but not strongly dentate at the base beneath; four hind tibiae of the male simple, not produced into a stout interno-apical spur.

Length: 1.46–1.97 mm. (*sine rostro*).

Holotype ♂, PONDOLAND: Port St. John, 5–30.iv.1923; *Allotype* ♀, same particulars; *Paratypes*, 8 ♂♂, 6 ♀♀, same particulars; 2 ♂♂, 6 ♀♀, same locality, 1–11.vi.1923; 1 ♂, 3 ♀♀, same locality, 12–30.vi.1923; 2 ♂♂, 1 ♀, same locality, 1–9.vii.1923; 1 ♂, 4 ♀♀, same locality, 15–31.viii.1923; 2 ♂♂, same locality, ix.1923; 1 ♂, same locality, x.1923; 1 ♀, same locality, 1–17.iii.1924; ZULULAND: Eshowe, 1 ♂, 5 ♀♀, iv.1926.

This little species belongs to the *verulamense-striaticeps* group and is very close to those species, but is easily recognised by the stouter rostrum, the rather more prominent eyes, the shorter broader pronotum without distinct sub-basal and sub-apical constrictions, the finer elytral striae and the infuscate apices of the femora; the clothing is of equal density over the whole elytron, not markedly shorter and finer in a deep V-shaped mark from the humeri to the disc.

Apion setulosum Beg.-Billc.

Apion setulosum Beg.-Billc., 1905, *Ann. Soc. ent. France* 74 : 146. (Madagascar.)

Apion penicillatum var. *basipenne* Mshl., 1932, *Stylops* 1 : 4. (South Africa.) **Syn. nov.**

Whilst re-arranging the *Apion* in the British Museum (N.H.) a male of *setulosum* was found bearing a co-type label and "*Apion setulosum* Beg. Billc.

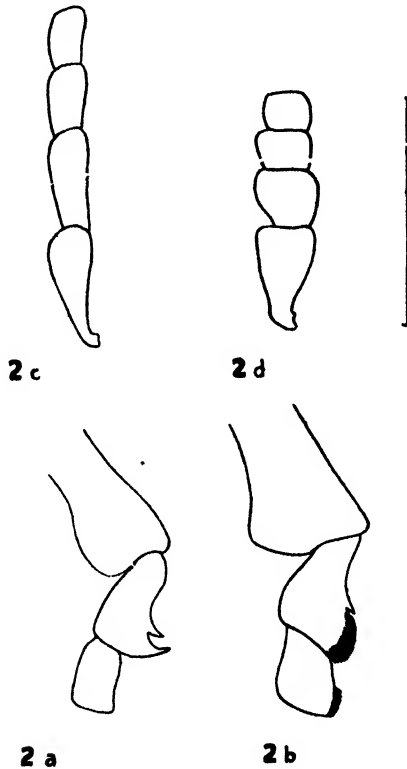


FIG. 2.—Apex of hind tibia and two basal segments of the tarsus of the male, lateral, (a) *Apion setulosum* Beg.-Billc.; (b) *A. penicillatum* Mshl. Scape and three basal segments of the funicle of the antenna of the female, (c) *setulosum* Beg.-Billc.; (d) *A. penicillatum* Mshl.

ex typis" in handwriting I do not know. This specimen agrees exactly with the original description and there is no reason to doubt the authenticity of the co-type label. It was at once apparent that *A. penicillatum* var. *basipenne* Mshl. was conspecific and a further examination of the original material of *penicillatum* Mshl. and the var. *leptorrhinum* Mshl. suggests that these two forms

are to be treated as specifically distinct from *setulosum*, although extremely closely related thereto. The differences are summarised thus:—

setulosum

♂. Basal segment of the hind tarsus (fig. 2, a) deeper at apex, produced into a strong ventral hook with an immediately anterior spine of equal size; spongy area very small; rostrum stouter.

♀. Rostrum longer (2.07); antennal segments longer than wide (fig. 2, c).

penicillatum

♂. Basal segment of the hind tarsus (fig. 2, b) not particularly deep at apex, not produced into a strong hook; three to four short ventral spines from the middle; spongy area larger; rostrum more slender.

♀. Rostrum shorter (1.1); antennal segments not longer than wide (fig. 2, d).

The presence of this Madagascan species in South Africa (and I have also examined three females from KENYA: Arabuko Forest, Malindi, v.40 (*T. H. E. Jackson* collector) and one female from TANGANYIKA: Lulunguru, 13.xii.1917, 17 m. W. of Tabora, 3766 ft., Wet season from end Nov. (*G. D. Hale Carpenter* collector)) is of considerable interest. The material available is not sufficient for dissections to be made to confirm this treatment in view of the likelihood of the abrasion of the fasciae, but the much longer or shorter rostrum and antennal segments of the females and the consistent differences in the basal segment of the hind tarsus of the males are characters normally indicating specific differences within the genus and can be relied upon in the present instance without much doubt.

***Apion capense* sp. n.**

♂♀. Derm black, moderately shining, surface clothing extremely scanty and very short and fine; head beneath the eyes with a broad transverse projecting plate with truncate apex, visible in lateral view as a sharp backward projecting tooth; internal and external elytral striae deeply and sharply impressed at the apex; legs not very elongate, tarsi short and rather broad; claws dentate at base beneath.

Head a little longer than wide (1.6 : 1.3), the eyes not prominent, flatly rounded, the temples short, about one-third the diameter of the eye, the vertex transversely shallowly constricted; frons slightly narrower than the base of the rostrum, flat, distinctly microreticulate but not dull, with a few very fine punctules; head beneath strongly microreticulate and quite dull with, posteriorly (in line with the posterior margin of the eye), a broad, flat, apically truncate plate, directed postero-ventrally, with free apex which appears like a sharp tooth in lateral view. *Rostrum* longer than pronotum but not as long as the head and pronotum together, slender, curved, cylindrical, parallel-sided from the base to the antennal insertion, thence very slightly attenuate to the apex, basally microreticulate, apically shining and smooth with distinct punctures which are coarser laterally; basi-lateral sulcus very obsolete but a fine ridge extends from the antennal insertion to the middle of the front margin of the eye; the space between the antennal insertion and the eye slightly greater than the diameter of the eye. *Antennae* fusco-testaceous, rather elongate and very slender, the scape short, not longer than the basal segment of the funicle which is, itself, not longer than the second segment, fourth to seventh segments progressively shorter but the seventh segment still elongate, twice as long as wide; club elongate oval, widest at middle segment, which is as long as the conical proximal segment. *Pronotum* as long as wide, sub-basal and sub-apical constrictions well marked, as wide at the middle as at base, apex five-sevenths the width of the base; dorsal outline moderately convex; distinctly microreticulate, not dull, sparingly and rather obsoletely punctured on the disc, barely visibly setiferous, without trace of a median dorsal sub-basal fovea. *Scutellum* extremely small, oval, slightly inflated.

Elytra ovate, sides evenly rounded; dorsal convexity strong, highest at middle, the convexity nearly regular; humeral callus distinct; distinctly striate, those of the disc more strongly impressed, those laterally rather shallowly impressed, first, second and ninth particularly strongly and deeply incised at apex where they unite; all striae catenate punctate, the punctures shallow; interstriae flat, three times as wide as the striae, obsoletely microreticulate but rather dull, with sparse very fine punctures, each bearing an excessively short fine hair; apices of the male rounded, of the female sharply rectangularly produced. *Venter* black, distinctly microreticulate, very obsoletely punctate; fifth ventrite of the male obscurely rugose, dull; of the female shining, obsoletely foveate or depressed in the middle. *Legs* quite short, hind femora barely exceeding the base of the apparent fifth ventrite, slender; hind tibiae slightly longer than the femur; tarsi rather short and broad, second segment of the four hind tarsi not longer than wide; distal segment shorter, or not longer than the proximal segment; claws with a short, obtusely pointed tooth at the base beneath.

Length: 2.20–2.37 mm. (*sine rostro*).

Holotype ♂, Camps Bay, Cape Peninsula, 1–20.x.1920; *Allotype* ♀, same particulars; *Paratypes*, 2 ♂♂, Cape Province, Swellendam, 17.xii.31–17.i.32; 3 ♀♀, Camps Bay, Cape Peninsula, 1–20.x.1920; 1 ♀, same locality, ix.1920.

This species is almost in the subgenus *Conapion*, but the elytral convexity is less great and not keel-shaped transversely; the presence of the peculiar ventral process of the head is not paralleled in any African species known to me, but it is found in *A. elegantulum* Germ. from Southern Europe and South-East Asia. *A. capense* does not appear to have any relationship with that species group and must stand as an isolated species for the time being.

A NEW SUBSPECIES OF *AËDES LEESONI* EDWARDS (DIPT., CULICIDAE) FROM THE SUDAN

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***Aëdes (Aëdimorphus) lesoni* Edwards, 1932, subsp. *verna* subsp. n.**

♀. *Head* with all decumbent scales on vertex narrow and nearly all pale. Proboscis uniformly dark above and below. Palpi dark. Tori dark anteriorly and pale above, almost bare. *Thorax* mainly dark brown. Scutum with many narrow dark scales and a few small areas of narrow scales, no broad scales on each side of the pre-scutellar space; scutellum with pale scales, those on median lobe narrow; some, usually most, of those on lateral lobes narrow, some intermediate and occasionally a few broad; scales on *a p n* narrow and on *p p n* nearly all narrow; paratergite with narrow and intermediate scales. About 10 post-spiracular and 20 sub-spiracular scales. *Abdominal* tergites with basal pale bands; sternites with dark apical bands. *Legs* mainly dark; hind femur dark all round for a short distance before tip, pale knee spot very small; pale spot at tip of hind tibia about as long as broad.

♂. Resembles ♀ in general but has dark tori and fewer post-spiracular scales. Palpi exceeding proboscis by length of last segment. Scales on *a p n* and *p p n* mostly narrow, some intermediate. Paratergite with broad and intermediate scales. *Terminalia* (fig. 1) closely resembling those of *A. lesoni* but distal horn of style much longer than projection at its base; distal spines 5 to 7 in number, spatulate, that on pubescent portion of style appearing pointed owing to its position; pubescent projection shaped as in *A. wigglesworthi* Edw., 1941.

Wing length: 3.1–3.8 mm.

Pupa. Integument mainly pale but with dark areas on posterior part of dorsum of thorax and on coxal area, trumpet pale except at tip. Dorsal seta divided near base into about 10 delicate branches; O and R divided very near base into about 8 delicate branches. Float hair pale; K long and pale; M a small dense tuft; S longer than K, branched; T about same length as K, branched. C-II a pale multiple tuft longer than its segment, C-III pale, half as long as its segment; C-IV and V pale with 4–7 branches, half as long as their segments. B-III single; B-IV–VI double, longer than their segments; B-VII weak, shorter than its segment. A-VII with 24 branches; A-VIII with about 13 plumose branches, situated anteriorly to the corner by $\frac{1}{4}$ of length of segment. Paddles broad and bluntly pointed as in *A. wigglesworthi*, margin smooth, seta minute, bifid or trifid.

Larva. *Head* distinctly broader than long. Antennae almost as long as head, spiculate, infuscated on distal half; tuft of about 9 branches at $\frac{2}{3}$; terminal and sub-terminal setae placed together at apex, the latter seta $\frac{1}{2}$ length of shaft; papilla on a cylinder of chitin shorter than diameter of shaft. A, B and C plumose, their bases and that of *d* almost in a straight line; A with about 6 branches, B 3-branched and C 4-branched, *d* minute, *e* and *f* with 4 branches. *Abdomen* (fig. 1): comb of about 20 scales. Siphon pale except for basal ring, index 4:3; anteriorly near base it narrows steeply to basal ring; pecten extending to about $\frac{1}{2}$ and consisting of about 21 spines of which the most distal 1 or 2 are wider spaced; most spines dark with one basal denticle, last 1 or 2 pale, last one simple; sub-ventral tuft very small, with about 5 branches, placed at about $\frac{2}{3}$. Anal segment with an



FIG. 1.—*Aedes leesonii* subsp. *verna* subsp. n.: a, terminalia of ♂; b, eighth and ninth abdominal segments of larva; c, base of a tuft of ventral brush of larva.

incomplete saddle, a few spicules near posterior margin; upper caudal seta with about 15 branches, as long as saddle, lower single, lateral seta small, branched. Ventral brush with six pairs of many branched tufts in the barred area and one unpaired tuft proximal to it, tufts with unusually wide bases. Gills lanceolate, longer than saddle, subequal.

ANGLO-EGYPTIAN SUDAN: Blue Nile Province, Danagla Forest, near Wad Medani, 22.viii.43 (*D.J.L.*), 1 ♀ (type) with its larval and pupal pelts (paedotypes), 3 ♂♂ (paratypes), all bred from early stages from newly-flooded swamp. Wad Medani, 11 & 12.ix.43, 7 ♂♂, 3 ♀♀ (paratypes), caught as adults. It is intended to send the type and some paratypes to the British Museum and other paratypes to the London School of Hygiene and Tropical Medicine.

From the type form, *A. lesoni*, the subspecies differs chiefly in the predominance of narrow scales on the scutellum, *a p n* and *p p n*, and in the form of the style of the ♂. In Edwards's (1941) key *A. l. verna* would run to section 25, differing from the indicated species in having narrow and intermediate scales on *p p n*. In the key to larvae of *Aedes* given by Hopkins (1938) the subspecies would run to section 41, differing from the indicated species in having antennae slightly shorter than the head.

The larva from Heiban in the Nuba mountains referred to by Lewis (1943: table I) as *Aedes* sp. is apparently *A. l. verna*. Specimens were obtained five times in May and June (twice with *A. hirsutus* Theo.) in domestic water jars (*A. A. Bereir*) to which they may have been transported. Another larva was obtained, with *A. hirsutus*, in a pool at Kadugli in May (*H. Ali*). Three young larvae from Kerripi, Equatoria Province (26.iv.43, *Nur El Huda*), appear to be *A. l. verna*. Unlike several other species of the subgenus *Aedimorphus*, *A. l. verna* has only been found in the early part of the rainy season.

Hundreds of males were seen in herbage under trees at Wad Medani on 11.ix.43. When flying they were seen to be sensitive to the sound of the human voice, rising sharply in the air and momentarily increasing their humming. Females bit before sunset.

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NOTES ON THE NOMENCLATURE OF SOME BRITISH PARASITIC HYMENOPTERA

By W. D. HINCKS, M.P.S., F.R.E.S.

THE following notes were made during an examination of the generic names used in several families of parasitic Hymenoptera, in connection with the preparation of a list of Hymenoptera for a *Check List of British Insects* on which Mr. G. S. Kloet and I have been working for some time. Their publication is necessary in order to explain certain synonymy adopted in this List. I have restricted the present notes to those questions which require annotation. Other synonymical matters which perhaps may be new to British workers though not new in themselves are included in the actual List. Besides these, there remain other questions not considered either here or in the List because vital data were not available. In any case it has not been the function of the present writer to attempt to revise the whole generic nomenclature of this great section of one of our largest Orders. However, in the pursuit of a fixed plan of procedure in the preparation of the Hymenoptera section of the *Check List* some inconsistencies have been discovered and these I have endeavoured to resolve.

The International Commission on Zoological Nomenclature have placed a small number of names in the parasitic Hymenoptera on the *Official List of Generic Names* by their action at Lisbon, approved and adopted by the Twelfth International Congress of Zoology in 1935, and published in the *Compte Rendu* of the Congress (1936 : 181-196). Full details of this important step are to be found in the new official organ of the Commission (1943, *Bull. zool. Nomencl.* 1 : 27-30).

There are several other instances in which action by the International Commission seems desirable, and a few such instances are referred to below. It is not my intention to make any applications to the Commission for suspensions of the rules at the present juncture, but rather I wish to draw the attention of Hymenopterists to these questions so that they may be thoroughly discussed before any action is taken.

There remain a certain number of other names which are preoccupied or incorrect in other ways, and have no claim to be preserved by the International Commission under their plenary powers. These names are dealt with here.

I am personally indebted to the Secretary of the International Commission, Mr. Francis Hemming, C.M.G., C.B.E., for much help in my work. I have to thank him for reading the manuscript of the present paper and for making valuable suggestions which I have followed. I must also express my indebtedness to the excellent publications of Henry L. Viereck (see Bibliography).

In view of the controversial nature of nomenclatorial work when unaccompanied by taxonomic evidence, I wish to state that I am entirely responsible for the conclusions which follow hereafter.

BRACONIDAE.

I have already published five short papers on the nomenclature of the BRACONIDAE and APHIDIIDAE (Hincks, 1943a, b, c, 1944a, b), so that the following notes represent merely a supplement to this previous work.

PROC. R. ENT. SOC. LOND. (B) 13. PTS. 3-4. (APRIL 1944.)

1. *Coeloides* Wesmael, 1838, *N. Mém. Acad. roy. Bruxelles* **11** : 59.

Coeloidina Viereck, 1921, *Proc. U.S. national Museum* **59**, no. 2364 : 133.

I have already (1943, *Entomologist* **76** : 97) given a short note on this genus based on the data recorded by Viereck (1914, 1921) and I there adopted the synonymy *Coeloidina* Viereck (= *Coeloides* Wesmael, *partim*).

Dr. Roy D. Shenefelt (1943) has just published a most interesting and valuable revision of the North American representatives of the genus *Atanycolus* Foerster, 1862. In this paper he examines fully the nomenclature of *Atanycolus* Foerster, 1862, *Coeloides* Wesmael, 1838, and *Coeloidina* Viereck, 1921. It is evident from the data which he records that the name *Coeloidina* Viereck is a redundant synonym of *Coeloides* Wesmael. Wesmael misidentified *Ichneumon initiator* Fabricius, 1793, a species actually belonging to *Atanycolus*, where it is so placed by Fahringer (1925) as *A. initiator* Nees. The Wesmaelian insect was renamed by Wesmael himself as *Coeloides scolyticida* Wesmael, 1838, and Shenefelt correctly regards this as the genotype of *Coeloides*. The type of *Coeloidina* Viereck is the congeneric *Coeloides melanotus* Wesmael, 1838, and thus Viereck's name is superfluous.

2. **Dolopsidea** nom. nov. pro *Dolops* Marshall, 1889, *Trans. ent. Soc. Lond.* **1889** : 206, *nec* Audouin, 1837, *nec* Agassiz, 1846.

Recently (1943, *Entomologist* **76** : 101), in discussing the genus *Dolops* Marshall, 1889, I decided that it would not be necessary to alter this pre-occupied name since *Dolops* Audouin, 1837, appears to be a *nomen nudum* and *Dolops* Agassiz, 1846, is only an emendation of *Doliops* Waterhouse, 1841.

The appearance (26 Oct. 1943) of *Opinion* 148 of the International Commission on Zoological Nomenclature has clarified the position regarding the interpretation of Articles 25 and 34 of the International Code as far as they concern generic names. Since it is ruled that “(2) A generic name is to be rejected as a homonym if it has previously been published as an emendation of another generic name of earlier date” it becomes necessary to propose a new name for Marshall's genus. I therefore propose *Dolopsidea* as a new name for *Dolops* Marshall, 1889, *Trans. ent. Soc. Lond.* **1889** : 206, *nec* Audouin, 1837, *nec* Agassiz, 1846.

The genotype is *Dolops hastifer* Marshall, 1889, by designation of Viereck (1914, *Bull. U.S. nat. Mus.* **83** : 48).

3. *Dapsilarthra* Foerster, 1862, *Verh. naturh. Ver. Rheinl.* **19** : 267.

Adelura Foerster, 1862, *loc. cit.* : 267, *nec* Bonaparte, 1854.

Adelurola Strand, E., 1928, *Arch. Naturgesch.* 1926, **92**, A8 : 51.

Adelura Foerster, 1862, is preoccupied by Bonaparte's Avian genus published in 1854. In 1928 Dr. Embrik Strand proposed the new name *Adelurola* for that of Foerster, evidently overlooking the fact that certain Foersterian synonyms of *Adelura* were available. Of these *Dapsilarthra* Foerster, 1862, has page priority and should replace the preoccupied *Adelura*. The monobasic genotype is *Alysia apii* Curtis, 1826.

ICHNEUMONIDAE.

4. *Chaeretymma* Foerster, 1868, *Verh. naturh. Ver. Rheinl.* **25** : 187.

Cratocryptus Thomson, C. G., 1873, *Opusc. ent.* **5** : 520.

The above synonymy is quite generally known and has been adopted to a very limited extent by modern authors. The genotype of *Chaeretymma* is

designated by Viereck (1914) as *Cryptus furcator* Gravenhorst, 1829, and the same author has pointed out that *Cratocryptus* Thomson with the same genotype is a synonym.

Difficulty, however, arises in the separation of this genus from that most frequently known as *Microcryptus* Thomson (1873); in fact *M. erythrinus* (Grav.) and *M. lacteator* (Grav.) are placed in the present genus under Thomson's generic name in such a recent work as that of N. F. Meyer (1933). If this action is supported, and it may well be correct judging from the descriptions only, a further complication arises in that *M. erythrinus* (Grav.) is the monobasic genotype of *Microcryptus*, which name therefore would become another synonym of *Chaeretymma*.

I am not proposing this new synonymy here as I have not yet had an opportunity of examining specimens of *M. erythrinus*, and for the present I am leaving both the species mentioned together with the closely allied *sperator* (Grav. 1829) in the old genus *Microcryptus*. In any case recent authors use *Pezoporus* Foerster, 1868, for *Microcryptus*, but as will be seen below this name is preoccupied.

5. *Aptesis* Foerster, 1850, *Arch. Naturgesch.* 16 (1) : 71.

Pezoporus Foerster, 1868, *Verh. naturh. Ver. Rheinl.* 25 : 181, nec Illiger, 1811, nec Klug, 1842.
Microcryptus Thomson, C. G., 1873, *Opusc. ent.* 5 : 520.

Microcryptus Thomson, 1873, has *Cryptus erythrinus* Grav., 1829, for genotype and as shown above may possibly become a synonym of *Chaeretymma* Foerster, 1868. Viereck (1914) has indicated that *Pezoporus* Foerster, 1868, with the monobasic genotype *Ichneumon nigrocinctus* Grav., 1815, should in any case be used for Thomson's genus. In fact this name has received a limited recognition amongst recent authors. It is overlooked, however, that it is preoccupied by Illiger in 1811 in the Aves and by Klug in 1842 in the Coleoptera.

Aptesis Foerster, 1850, of which the genotype was selected by Viereck (1914) as *Ichneumon sudeticus* Grav., 1815, has been used as a separate genus in the days when brachyptery was regarded as a generic character and subsequently, oddly enough, it was used as a subgenus of the more recent *Microcryptus*. I propose to use the Foersterian name in place of *Microcryptus* and instead of the preoccupied *Pezoporus*, over both of which it has priority. I believe the genotype *I. sudeticus* is conspecific with *I. nigrocinctus*, the genotype of *Pezoporus*.

It should be remembered that *Aptesis* has been used by many older authors in a very loose sense to include several widely different brachypterous Cryptines, and that as now applied it will be restricted to the brachypterous *nigrocinctus* group and to the congeneric macropterous species hitherto ranged under *Microcryptus*. It may be noted in passing that brachyptery in these insects is restricted to the female sex.

6. *Agrothereutes* Foerster, 1850, *Arch. Naturgesch.* 16 (1) : 71.

Gambrus Foerster, 1868, *Verh. naturh. Ver. Rheinl.* 25 : 188.
Spilocryptus Thomson, C. G., 1873, *Opusc. ent.* 5 : 501.

It is doubtful if there is any difference of generic value between *Gambrus* and *Spilocryptus* : indeed they are often regarded as subgenera only. Viereck (1914) has designated *Pezoporus abbreviator* (Grav. 1829), which seems to be the same insect as *Ichneumon abbreviator* Fabricius, 1793, as the genotype of *Agrothereutes*. This is congeneric with *Spilocryptus hospes* (Tschek, 1870)

(= *Spilocryptus zygaenarum* Thomson, 1873), the type of *Spilocryptus* Thomson, 1873, and *Agrothereutes* therefore has priority over Thomson's name.

7. *Exolytus* Foerster, 1858, in Holmgren, *Svensk. Vet.-Akad. Handl.* 15 : 328.

Mesoleptus (Gravenhorst) Viereck, 1914, *Bull. U.S. nat. Mus.* 83 : 93.

8. *Mesoleptus* Gravenhorst, 1829, *Ich. Eur.* 2 : 3.

Mesoleptidea Viereck, 1912, *Proc. ent. Soc. Washington* 14 : 176.

Viereck (1914) has pointed out that the genotype of *Mesoleptus* Gravenhorst, 1829, is *Ichneumon laevigatus* Gravenhorst, 1820, by designation of Curtis (1837). This species is also the monobasic genotype of *Exolytus* Foerster and accordingly the two names would be synonymous, the Stilpnine genus being known as *Mesoleptus* Grav. and the Tryphonine genus taking the name *Mesoleptidea* Viereck, 1912.

As *Mesoleptus* is the typical genus of the Mesoleptini and because these changes of name will cause much confusion, I consider that it would be advisable to ask the International Commission on Zoological Nomenclature to suspend the rules in this case by invalidating Curtis's selection of the genotype. Westwood (1840) selected *Mesoleptus narrator* Grav., 1829, as genotype which hardly helps matters, as this species appears to belong to another genus. The genotype of *Mesoleptidea* Viereck, 1912, which would be a synonym of *Mesoleptus* if my suggestion is followed, is *Mesoleptus cingulatus* Grav., 1829, by original designation, and this might serve as the genotype of Gravenhorst's old genus.

I might add that Curtis appears to have had no very clear idea of *Mesoleptus* and his folio (no. 644) is very confused; at least part of his generic characters are taken from his new species *Mesoleptus walloni*, which is a synonym of *Cataglyphus fuscicornis* (Gmelin, 1790) according to Morley (1911).

9. *Lampronota* Curtis, 1832, *Brit. Entom.* 9 : 407.

Meniscus Schioedte, 1839, *Mag. de Zool.* 9 : 10.

10. *Cylloceria* Schioedte, 1838, *Rev. zool. (Soc. Cur.)* : 140.

Lampronota auctt. nec Curtis, 1832.

There is some confusion between the names *Lampronota* Curtis, 1832, *Meniscus* Schioedte, 1839, *Cylloceria* Schioedte, 1838, and *Xenacis* Foerster, 1868. The genotype of *Lampronota* Curtis (Viereck erroneously states monobasic) is *Ichneumon setosus* Geoffroy in Fourcroy, 1785, by original designation. This species is always regarded as belonging to *Meniscus*, and congeneric with the genotype of the latter, *Ichneumon catenator* Panzer, 1804. *Meniscus* Schioedte, 1839, will therefore become a synonym of the prior *Lampronota* Curtis, 1832. Viereck (1914), who points out the above details, goes on to comment that *Lampronota* auctt. nec Curtis, 1832, will be replaced by *Cylloceria* Schioedte, 1838. The type of *Cylloceria* is designated by Viereck as "*(Phytodietus) Cylloceria caligata* (Gravenhorst) Schioedte" and his comments are therefore correct in that *Cylloceria* should replace *Lampronota* auctt. nec Curtis, but I think his inclusion of *Xenacis* Foerster, 1868, as a synonym of *Cylloceria* must be due to a mistake caused by the fact that Gravenhorst described three species of PIMPLINAE under the specific name of *caligatus*. One is the above-quoted *Phytodietus caligatus* Gravenhorst, 1829 (*Ich. Eur.* 2 : 936) and another is *Lissonota caligata* Grav., 1829 (*Ich. Eur.* 3 : 38). The latter is

the monobasic genotype of *Xenacis* Foerster, 1868. I have no evidence that these two references represent the same species and I therefore infer that *Xenacis* should be maintained as distinct from *Cylloceria*.

11. *Cteniscus* Haliday, 1836, in Curtis, *Guide Brit. Ins.* ed. 2 : 98, and

12. *Exenterus* Hartig, 1837, *Arch. Naturgesch.* 3 (1) : 156.

Westwood (1840) designated *Tryphon* (*Cteniscus*) *curtisii* Haliday, 1838, as the genotype of *Cteniscus* Haliday, 1836. The monobasic genotype of *Exenterus* Hartig, 1837, is *Tryphon marginatorius* Gravenhorst, 1829 (= *Ichneumon marginatorius* Fabricius, 1793). If authors are correct in placing these two species in *Exenterus*, then it follows that that genus must take the name *Cteniscus* Haliday, and *Cteniscus* of authors will require a new name in the event of the two genera being maintained as distinct.

According to Morley (1911 : 204) however (who places the two genera together under *Exenterus*), there is a prior citation by Curtis, overlooked by Viereck (1914), of *Cteniscus aurifluus* Haliday, 1838, as the genotype of *Cteniscus*.¹

Curtis's citation retains the *status quo* undisturbed, but whether his designation can be accepted I do not know, since it was made in 1832 prior to the appearance of *Cteniscus* in the second edition of Curtis's *Guide* and before the genus was described by Haliday in 1838.

Personally I am inclined to regard the genus *Cteniscus* as dating from 1832 (Haliday in Curtis), and *C. aurifluus* Haliday is therefore the genotype by original designation.

13. *Diadegma* Foerster, 1868, *Verh. naturh. Ver. Rheinl.* 25 : 153.

No species was included in this genus by Foerster, but in 1908 Morley placed in this genus the single new species *Diadegma anomala* Morley, 1908, which has therefore been accepted as the type of Foerster's genus. It appears, however, that a year previously (1907) Schmiedeknecht adopted *Campoplex crassicornis* Gravenhorst, 1829, as the type of this genus. Morley (1914 : 169) refers to this matter again and places *Campoplex crassicornis* Grav. in the genus *Meloboris* Holmgren, 1858. It would appear that Morley's use of the name *Diadegma* is invalid but the affinities of his insect are so doubtful that its correct placing must await further study.

14. *Eustiphrosomus* nom. nov. pro *Stiphrosomus* Foerster, 1868, *Verh. naturh. Ver. Rheinl.* 25 : 198, nec Fieber, 1858.

The name *Stiphrosomus* Foerster, 1868, is preoccupied by that of Fieber, 1858, proposed for a genus of Hemiptera. I therefore propose *Eustiphrosomus* n. n. to replace the invalid name of Foerster. The genotype is *Ichneumon fuscicornis* Gmelin, 1790, by designation of Viereck (1914).

15. *Phobetellus* nom. nov. pro *Phobetus* Thomson, C. G., 1889, *Opusc. Ent.* fasc. 13 : 1430, nec Leconte, 1856.

The name *Phobetus* of Thomson is preoccupied by that of Leconte proposed for a genus of Coleoptera. The name *Phobetes* Foerster, 1868, is not available

¹ Curtis 1832 : 399, "Mr. Haliday has discovered two new species [of *Tryphon*], one *T. aurifluus* (the type of his proposed subgenus *Cteniscus*) occurs on Willows from July to Sept.;"

as it appears to apply to a distinct genus defined by Davis (1897) on a single North American species (Viereck 1914). I therefore propose the name *Phobetellus* to replace that of Thomson. The genotype is *Tryphon fuscicornis* Holmgren, 1854, by designation of Viereck (1914).

16. **Ipoctoninus** nom. nov. pro *Ipoctonus* Foerster, 1868, *Verh. naturh. Ver. Rheinl.* 25 : 199, nec Heine, 1860.

The name *Ipoctonus* of Foerster is preoccupied by that of Heine used for a genus of Birds. Heine's name is an emendation for *Dendropicos* Malherbe, 1849, but *Opinion* 148 of the International Commission on Zoological Nomenclature rules that names are to be rejected as homonyms if predated by emendations of earlier names. I therefore propose the name *Ipoctoninus* n. n. to replace that of Foerster. The genotype is *Ichneumon chrysostomus* Gravenhorst, 1820, designated by Viereck (1914).

17. **Otlophorinus** nom. nov. pro *Otlophorus* Schmiedeknecht, 1914, *Opusc. Ich.* : 2867, nec Foerster, 1868.

Viereck (1914) has designated *Tryphon vepretorum* Gravenhorst, 1829, as the genotype of *Otlophorus* Foerster, and in this he appears to be correct since Thomson (1894), the first to revise Foerster's genus, included *vepretorum* under his section 6 of *Mesoleius* (*Otlophorus*). Schmiedeknecht seems to be the next author revising the group and he states that *vepretorum* should be referred to *Protarchus* Foerster, 1868. *Protarchus* has page priority and *Otlophorus* Foerster therefore becomes a synonym. Schmiedeknecht's genus is without a name, and in order to supply this deficiency I propose *Otlophorinus* n. n. and hereby select *Mesoleius pulverulentus* Holmgren, 1855, as genotype.

18. **Prospudaea** nom. nov. pro *Spudaea* Foerster, 1868, *Verh. naturh. Rheinl.* 25 : 211, nec Snellen, 1867.

Spudaea Foerster is invalidated by the prior use of the name by Snellen in the Lepidoptera. The emendation *Spudaeus* Thomson, 1883, of Foerster's name is antedated by *Spudaeus* Gistel, 1848, and *Spudaeus* Dallas, 1851. I therefore propose *Prospudaea* n. n. to take the place of Foerster's name. The monobasic genotype is cited as *Trematopygus* (*Spudaea*) *clypearis* Brischke, 1888, by Viereck (1914).

19. *Therion* Curtis, 1829-30, *Guide Brit. Ins.* (4) : 101.

Therion Curtis, 1839, *Brit. Entom.* 16 : 736.

Exochilum Wesm., 1849, *Bull. Acad. Roy. Bruxelles* 16 (2) : 119.

I do not know why Viereck (1914) and other authors have given preference to Wesmael's name when *Therion* Curtis, clearly has priority. The two genera are isogenotypic, having *Ichneumon circumflexus* Linnaeus, 1758, for type, by designation of Curtis (1839) in the case of *Therion*. The genus *Exochilum* is monobasic. In my opinion *Therion* Curtis, should be reinstated.

20. *Anomalon* Jurine, 1807, *N. Méth. class. Hyménopt.* : 114.

Paranomalon Viereck, 1912, *Proc. ent. Soc. Wash.* 14 : 175.

Anomalon is the typical genus of the Anomalonini. According to Viereck (1914) the genotype is *Ichneumon ruetatorius* Fabricius, 1781, and the genus is therefore identified with *Bassus* auctt. nec Fabricius [1804-5]. If this were

accepted, the genus would be isogenotypic with, and take precedence over, *Diplazon* Nees, 1818. The group or subfamily name based on *Diplazon* would also be replaced. Gravenhorst (1829) used the name *Anomalon* in an entirely different sense and has been followed by almost all authors. In my view considerable inconvenience and confusion would be avoided by retaining *Anomalon* in Gravenhorst's sense. The designation of *Ichneumon laetatorius* as genotype was made by Curtis (1828), the first to divide Jurine's composite genus, and *Anomalon* can only be retained as understood by Gravenhorst (1829) if the International Commission agree to use their plenary powers to that effect.

Paranomalon Viereck, 1912, was proposed to replace *Anomalon* auctt. nec Jurine.

21. *Campoplex* Gravenhorst, 1829, *Ich. Eur.* 3 : 453.

Campoplegidea Viereck, 1912, *Proc. U.S. nat. Mus.* 42 : 633.

Westwood (1840) designated "*C. difformis* Gr." as the genotype of *Campoplex*. Gravenhorst's *difformis* appears to have been a composite species, but at least part of his description applies to *Ichneumon difformis* Gmelin, 1790, which led Viereck (1914) to cite the genotype as (*Ichneumon*) *Campoplex difformis* (Gmelin) Gravenhorst. *Angitia rufipes* Gravenhorst, 1829, appears also to be partly included with *difformis* by Gravenhorst.

Ichneumon difformis is usually placed in the genus *Omorga* Thomson, 1887 (= *Omorgus* Foerster, 1868, nec Erichson, 1847) and Viereck therefore states that *Campoplex* Grav. [= *Omorgus* (Foerster) Thomson]. Meyer (1935) has recently treated *difformis* as belonging to *Eulimneria* Schmiedeknecht, 1907 (= *Limneria* Thomson, 1887, nec Adams, 1851, nec Holmgren, 1858). Should this position be correct, it would be necessary to replace *Eulimneria* by *Campoplex*.

Since Viereck (1912) has designated *Limneria mutabilis* Holmgren, 1858, as the genotype of *Omorgus* Foerster, 1868, and if the position of this species as a *Eulimneria* as indicated by Meyer is correct, then on the basis of its genotype also *Omorga* (*Omorgus* Fst.) becomes a synonym of *Campoplex* Grav.

Campoplegidea was proposed by Viereck (1912) to take the place of *Campoplex* auctt. nec Grav., but it seems very necessary that before this can be adopted these genera of the Campoplegini should be re-examined in respect to the various genotypes proposed.

In my opinion Westwood's designation of Gravenhorst's *difformis* should be rejected on account of its composite nature, and as Viereck's citation of *Campoplex oxyacanthae* Boie., 1855, as the genotype of *Campoplegidea* represents a species not originally included in *Campoplex*, it should also be rejected in favour of a new designation which would preserve this well-known genus *Campoplex* as usually understood.

22. *Sagaritopsis* nom. nov. pro *Sagaritis* Holmgren, 1858, *K. svenska Vetensk. Akad. Handl.* 2 (8) : 43, nec Huebner, [1821].

The generic name *Sagaritis* Holmgren, is preoccupied by that of Huebner used for a Lepidopterous genus. I therefore propose the name *Sagaritopsis* n. n. to replace that of Holmgren. The genotype is *Campoplex declinator* Gravenhorst, 1829 = *Ichneumon dilator* Thunberg, 1822, by original designation.

23. *Absyrtus* Holmgren, 1858, *K. svenska Vetensk. Akad. Handl.* 2 : 32.

This name has been previously used by Rafinesque in 1815, but since the latter appears to be a *nomen nudum* it will not be necessary to replace Holmgren's name. The emendation *Absyrtes* proposed by Brischke in 1880 is invalid and the name has in any case been previously used by Guenée in 1857.

24. *Porizon* Fallén, 1813, *Spec. nov. Hymenopt.* (2) : 18.

Thersilochus Holmgren, 1858, *K. svenska Vetensk. Akad. Handl.* 2 (8) : 135.

The monobasic genotype of *Porizon* is *Ichneumon moderator* Linnaeus, 1758, according to Viereck (1914), and this species being a species of *Thersilochus*, it becomes necessary to replace that genus by *Porizon*. *Porizon* auctt. nec Fallén was renamed *Porizonidea* by Viereck (1914).

I am personally inclined to accept the position required by the application of the rules and not to ask the Commission to use their plenary powers in this case, since both genera belong to the same group, the Porizonini, and the changes involve little inconvenience.

EURYTOMIDAE.

25. *Eudecatoma* Ashmead, 1888, *Ent. Amer.* 4 : 42.

Decatoma auctt. nec Spinola, 1811, *Ann. Mus. Hist. nat. (Paris)* 17 : 151.

In 1904 Ashmead designated *Chrysis adonidum* Rossi, 1790, as the genotype of *Decatoma* Spinola. Dalla Torre (1898) places this species as a synonym of *Eurytoma aterrima* (Schrank, 1781). If the specific synonymy is correct, *Decatoma* Spinola becomes a synonym of *Eurytoma* Illiger, 1807, to which genus *aterrima* now belongs. *Decatoma* as understood by modern authors will thus require another name. Balduf (1932, *Proc. U.S. nat. Mus.* 79, art. 28 : 4) revised the North American species of the genus but failed to notice this matter. The only synonym of *Decatoma* he mentions is *Eudecatoma* Ashmead, and this is available to replace *Decatoma* of authors.

The genotype of Ashmead's genus is the American *Decatoma batatoides* Ashmead—monobasic, through subsequent reference, according to Gahan and Fagan (1923).

ENCYRTIDAE.

26. *Mayrencyrtus* nom. nov. pro *Liothorax* Mayr, 1875, *Verh. zool. bot. Wien* 25 : 728, nec Motschulsky, 1860.

Liothorax Mayr is preoccupied by *Liothorax* Motschulsky proposed in 1860 for a genus of Coleoptera. I therefore propose *Mayrencyrtus* n. n. to replace the invalid name of Mayr. The monobasic genotype is *Encyrtus glaphyra* Walker, 1837.

PTEROMALIDAE.

27. *Euamblymerus* nom. nov. pro *Amblymerus* Walker, 1834, *Ent. Mag.* 2 : 303 (*partim*).

The genotype of *Amblymerus* Walker, 1834, is *A. amoenus* Walker, 1834, by designation of Westwood (1840). Unfortunately *Eutelus dilectus* Walker, 1834, is the genotype of *Eutelus* Walker, 1834, by designation of the same author and this species is a synonym of *Amblymerus amoenus*. The transfer of *amoenus*

to *Eutelus* (to which genus it appears to belong) as the valid name for *E. dilectus* will necessitate the use of *Amblymerus* in place of *Eutelus* and the substitution of *Euamblymerus* n. n. for *Amblymerus* Walker, *partim*.

Ashmead (1904) overlooked Westwood's citation of the genotype of *Amblymerus* and designated *Amblymerus dubius* Walker, 1834, which may be accepted as the genotype of the present genus.

28. **Neopolycelis** nom. nov. pro *Polycelis* Thomson, C. G., 1878, *Hym. Scandin.* 5 : 143, nec Ehrenberg, 1831.

Polycelis is already in use by Ehrenberg, 1831, for a genus of Vermes. The emendation of Ashmead proposed in 1894 to *Polyscelis* and adopted by Dalla Torre (1898) is also preoccupied by the emendation of Ehrenberg's name proposed by Girard in 1850. I therefore suggest the name *Neopolycelis* n. n. to replace that of Thomson.

The genotype is *Pteromalus conspersus* Walker, 1835.

MYMARIDAE.

29. *Mymar* Curtis, 1832, *Brit. Entom.* 9 : 411.

The name *Mymar* first appeared in Curtis's *Guide* (4) (1829-30 : 112) as *Mymar* Hal[iday]. Haliday described it in 1833, but Curtis had previously (1832) described and figured the genus and listed 20 species. The list was stated to be based on Walker's notes, but the description of the genus is undoubtedly Curtis's own work and it should be credited to him rather than to Haliday (who probably first recognised it), Walker, or Walker in Curtis, as is done by various authors.

Curtis designated *Ichneumon punctum* Shaw, 1798, as the genotype, and subsequently Westwood (1840) cited *Mymar pulchellus* Curtis, 1832, as the type. If Curtis's prior selection were accepted, *Mymar* would have to be used instead of *Anaphes* Haliday, 1833, which is isogenotypic with it, having *I. punctum* as its genotype. This synonymy is adopted by Gahan and Fagan (1923). Thus the genus *Mymar* of authors would require another name, perhaps either *Flabrinus* Rondani, 1877, or *Mymarilla* Westwood, 1879, being substituted for it. However, Curtis, in describing the genus *Mymar*, also figured and described *M. pulchellus* Curtis, and he states underneath his generic description "Obs. The dissections and descriptions are taken from the species figured", I therefore consider, since *Ichneumon punctum* does not belong to the same genus as *M. pulchellus* on which Curtis based his generic diagnosis, being described as an *Anaphes* by Haliday in 1833, that Curtis was incorrect in selecting Shaw's species as the genotype of his genus. Westwood's designation of *M. pulchellus* is therefore valid and should be followed as hitherto.

PLATYGASTERIDAE.

30. **Ectadius gynomamertes** nom. nov.

Platygaster mamertes Walker, 1835, *Ent. Mag.* 3 : 227, female only.

In 1835 Walker described *Platygaster mamertes* from male specimens taken by himself and Haliday. He also added the description of a female taken by Haliday which he doubtfully associated with this species.

The male was transferred to *Synopeas* Foerster, 1856, by Marshall (1873, *Cat. Brit. Hymenopt. Oxyura* : 19) and the female was also doubtfully referred

to the same position. Kieffer (1926) retained the male in *Synopeas* but placed the female in *Ectadius* Foerster, 1856, using the specific name *mamertes* Walker for both species.

In following Kieffer's arrangement it will be necessary to rename the female placed in *Ectadius* and I therefore propose the name *gynomamertes* n. n. for *Platygaster mamertes* Walker, 1835, ♀, nec ♂.

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A NOTE ON THE GENUS *NOTIOTHEMIS* RIS, WITH THE DESCRIPTION OF A NEW SPECIES (ORDER ODONATA)

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

AMONG a small series of specimens representing species belonging to the sub-family TETRATHEMINAE (family LIBELLULIDAE), collected by Professor G. D. Hale Carpenter in Uganda during the year 1928, are three belonging to the little known genus *Notiothemis* Ris. One of these is a variety of *N. jonesi*, the genotype, whilst the other two belong to a new species. In describing these, I have been greatly assisted by the loan of a typical male of *N. jonesi* Ris from Mr. J. E. H. Robert's collection of Odonata.

Notiothemis jonesi Ris.

Notiothemis jonesi Ris, 1916, *Cat. Coll. Selys* 16 : 1054, fig. 613.
Ris, 1920, *Ann. S. African Mus.* 18 : 390.

Our knowledge of the genus *Notiothemis* has up to the present been restricted to four males of *N. jonesi* Ris :—the type from Balwa, Usambara, in the Morton collection now housed in the Royal Scottish Museum; a male from Eldoret, East Africa, viii.13; and two males from M'Fongosi, Zululand, all in the South African Museum. To these I am now able to add two more males, one of which is a well-marked variety, whilst the other is typical save for some minor venational differences. This latter specimen is from Homa Pt, Kavirondo, Lake Victoria, vii.28, coll. Wilkinson, and shows some deformity of the venation in the left fore-wing, where Riii and IRiii are fused for their distal halves and a supplementary vein to the Bridge is present, resulting evidently from this deformity. Other details of the venation are as follows :—nodal index $\frac{7-10}{7-8} \mid \frac{8-7}{8-7}$; hypertrigones traversed once in the fore-wings, free in the hind; anal-loop made up of 8 cells in both hind-wings; discoidal cell of right fore-wing normal, that of the left four-sided as in *Tetrathemis*.

Notiothemis jonesi var. *auricolor* var. n. (fig. 2, a).

Male. Abdomen 21 mm. Hind-wing 24 mm.

Differs from type by the greatly restricted dark markings on the thorax and legs: this character is not due to a teneral condition as might be suspected, for the insect is actually an elderly adult with the wings becoming palely infuscated from age.

Head and prothorax similar to type; thorax bright citron yellow on dorsum, pea-green on the sides, marked with reddish-brown and dark blackish-brown as follows :—a blackish-brown quadrate spot of moderate size on middorsum situated at the junction of the upper and middle thirds and falling just short of the antealar sinus, the yellow middorsal carina bisecting it finely; a narrow reddish-brown to ferruginous antehumeral stripe broad below but tapering above to a fine point which ends at about the level of the middle of the quadrate spot but without becoming confluent with it; a narrow blackish-brown posthumeral stripe, broadest above where it sends a fine prolongation inwards bordering the antealar sinus but not quite extending to middorsal carina, the yellow here becoming confluent with the yellow of antealar sinus; this stripe very sinuous or crenulate in outline and bordered obscurely behind by brownish which fades into the green ground-colour. A median lateral

stripe commencing below the hind-wing axillary and running downwards over the spiracle at which point it expands to include that organ. Both stripes continued below under the thorax to meet their fellows from the opposite side. Finally the extreme posterior angle of

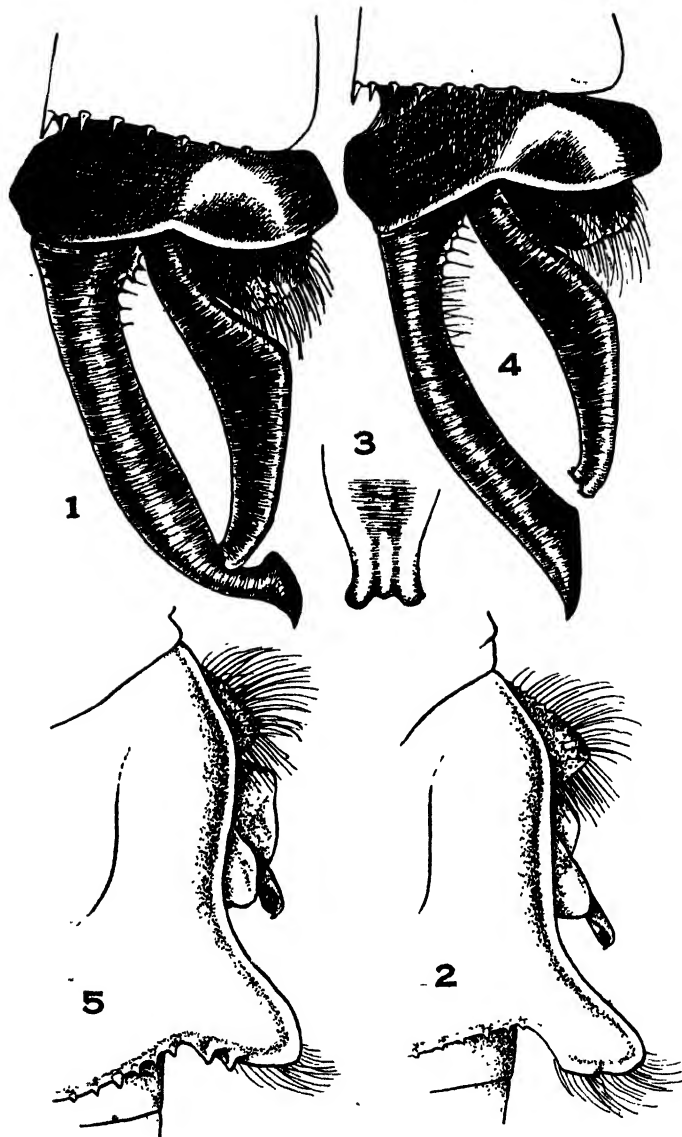


FIG. 1.—1. Anal appendages of *Notiothemis jonesi* Ris, male, seen from the right side. 2. Genitalia of same. 3. Apex of inferior anal appendage, ventral view. 4. Anal appendages of *Notiothemis robertsi* sp. n., seen from the right side. 5. Genitalia of same.

the metepimeron blackish-brown. Legs black, femora greenish-yellow on their inner sides. Venation :—Anal-loop made up of 6 and 8 cells in the hind-wings, hypertrigones of fore-wings traversed once in fore-wings, free in the hind, CuP well separated from the hinder

angle of discoidal cell in hind-wing, discoidal cells normal in fore-wing, but with costal side not recessed as it is in the type and other specimens examined. Nodal index $\frac{8-9}{9-8} | \frac{9-8}{8-9} : 2$ Cuq in the hind-wings: no supplementary veins to Bridge.

Habitat: UGANDA: Fort Portal, Western Province, 3.xii.27, coll. G. D. Hale Carpenter (alt. c. 5000 ft.).

In addition to the greater extent of the pale ground-colour, this variety differs from type by the normal character of the discoidal cell in the hind-wing. *Type* will be deposited in the British Museum (Natural History).

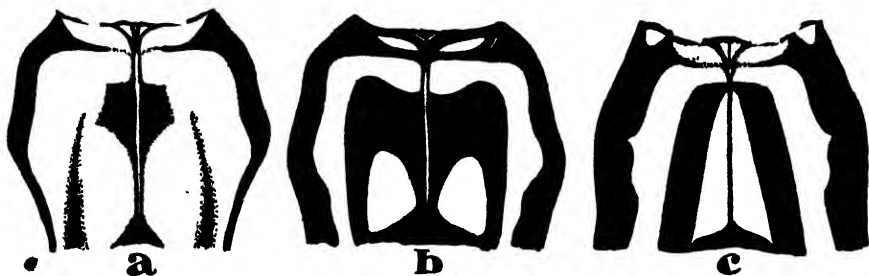


FIG. 2.—Thoracic dorsal markings of:—a. *Notiothemis jonesi* var. *auricolor* var. n. b. *Notiothemis jonesi* Ris, typica. c. *Notiothemis robertsi* sp. n.

Notiothemis robertsi sp. n. (figs. 1, 4 and 5, 2, c).

Male. Abdomen 20–22 mm. Hind-wing 23–25 mm.

Head with labium bright ochreous, the middle lobe and the borders of the lateral lobes narrowly black; labrum glossy steely blue-black, face and frons pale bluish-green (pale turquoise blue) with two transversely oval slightly metallic blackish spots and a broad sharply limited blue-black basal stripe on the front and upper parts of frons respectively, vesicle metallic blue-black, occiput dark reddish-brown; behind eyes steely blue-black. Prothorax pale greenish with the sutures and border of posterior lobe narrowly clouded with reddish-brown. Thorax pea-green marked with dark blackish-brown as follows:—moderately broad antehumeral stripes meeting at a point just short of the antealar sinus and diverging slightly below so as to enclose a long narrow yellow triangle of the ground colour with its apex directed upwards, 3 lateral stripes of even thickness, the first post-humeral, with very sinuous or crenulate anterior border and with its upper end prolonged finely medially along the lower border of antealar sinus, which is itself narrowly outlined in black; a second stripe running obliquely downwards from the axillary of the hind-wing and crossing the spiracle; finally a vestigial stripe on the posterior angle of the metepimeron. The two former stripes descending to lower part of thorax and passing across the pectus to meet their fellows from the opposite side. Legs black save for the inner side of the anterior femora which are greenish-yellow. Armature and claw-hooks as for genus. Wings hyaline, palely tinted with yellow at extreme bases especially in the subcostal and cubital spaces; pterostigma rather short and broad, covering 2 cells, narrowing slightly distally, dark reddish-brown in colour; no supplementary veins to Bridgé; nodal index $\frac{9-10}{9-9} | \frac{11-8}{8-9}$

$\frac{7-9}{8-8} | \frac{9-9}{8-7}$

1 cubital cross vein (Cuq) in fore-wings, 3 in the hind; anal-loop made up of 6 to 7 cells; CuP slightly separated from the lower angle of discoidal cell in hind-wing; base of discoidal cell in hind-wing well distal of arculus; discoidal cells of fore-wings normal in shape, that of hind-wings with costal side recessed as in *N. jonesi*; hypertrigones traversed once

in all wings; 3 rows of cells between the anal-loop and base of wing. Abdomen black marked with greenish-yellow as follows:—the sides of segments 1 and 2 and basal three-fourths of 3 rather broadly, tapering posteriorly on the latter segment and finely interrupted by the transverse carina. The dorsum of segment 2 with subapical and subbasal transverse yellow stripes which are connected with the lateral yellow areas: on segment 3 the lateral yellow continued basally over dorsum to meet this colour on the opposite side; segments 4 to 6 with lateral yellow stripes similar to those on 3 but becoming shorter and shorter from segment to segment and vestigial on segment 6: segment 7 wholly bright yellow save for a narrow apical black ring; segments 8 to 10 wholly black. Anal appendages black: superiors nearly three times as long as segment 10, broad at base which is minutely spined along its outer lower border, then narrowing, cylindrical to the end which ends in an acute point and bears an obtuse point below subapically. Inferior appendage about one-fifth shorter, triangular, curved gently upwards to its apex, which is truncate and shallowly notched. Genitalia of second segment very similar to that of *N. jonesi*, differing chiefly by the shape of the lobe, which is broader, less sharply pointed, obtusely angulated to body axis and bears 3 or 4 robust spines on its free posterior border.

Habitat: UGANDA, shores of Lake Victoria during July-August, collected by G. D. Hale Carpenter. The *type* will be deposited in the British Museum (Natural History).

This new species differs from *jonesi* in the following points:—Dorsal marking of thorax, steely black labrum (pale green in *jonesi*), 3 Cuqs in hind-wing (2 only in *jonesi*), all hypertrigones traversed (only those of fore-wings in *jonesi*), base of discoidal cell of hind-wing distal to arculus, shape of anal appendages etc.

The venational differences between *jonesi* and this new species call for some amendments in the definition of the genus *Notiothemis* as follows:—Base of discoidal cell in hind-wing at the level of or considerably distal to the arculus: 2 to 3 Cuqs in hind-wings; anal-loop made up of 6 to 10 cells: discoidal cell of fore-wing normal in shape or, more rarely, 4-sided, that of hind-wing normal or with the costal side recessed. This new species is named after Mr. J. E. H. Roberts in acknowledgment of much helpful criticism and loans of material and literature.

The extreme variability of the venation found in all of these supposedly archaic forms and the frequent occurrence of a four-sided discoidal cell simulating that found in the Anisozygoptera is a matter for consideration. It might be thought that insects of such antiquity would have long ago arrived at a state in which the venation is fully crystallised. That it is not so, or appears to be not so, is, I believe, due to a process of degeneration which one would expect to meet in types approaching extinction, and what is actually exhibited in their venation is a reversion to an older archaic type.

AN ILLUSTRATED CATALOGUE OF THE PALEARCTIC *MELITAEAE* (LEP. RHOPALOCERA): ERRATA

By L. G. HIGGINS, M.A., F.R.C.S., F.R.E.S.

SINCE the publication of "An illustrated catalogue of the palearctic *Melitaea*" in 1941 (*Trans. R. ent. Soc. Lond.* 91: 175-365) several mistakes have become obvious. I am grateful to various friends who have helped to make corrections, including Colonel H. D. Peile, Mr. E. P. Wiltshire and Mr. Francis Hemming. There is one serious error which affects the nomenclature of *M. diamina* Lang. I must accept responsibility for this mistake, and my only excuse is the difficulty in 1941 of checking the original reference in Ernst and Engramelle. Unfortunately the page of reference is missing in my copy, and at that time most books of this character had been removed from London and were difficult to consult. The correct nomenclature is now shown, and I hope that nothing has been published during the interval which will repeat my original mistake.

A somewhat longer list of addenda, including the description of an undescribed form discovered by Mr. Wiltshire, must await publication until more space is available.

ERRATA.

Page

188. Map 7. *Melitaea consulis* (c) should be placed in southern Iran and not in Arabia.
191. Line 13. For "*Melitaea turkmanica* Higgins" read "*turkmanica*".
204. Line 41. For "1871" read "1870".
216. Line 44. For "*ignaea*" read "*igneae*" Verity.
217. Line 9. For "*ignaea*" read "*igneae*" Verity.
221. Lines 37 and 39. For "*siberica* Heyne" read "*sibirica*". (Correction of spelling.)
224. *Melitaea perseae* heading, after fig. 6 ♂ insert fig. 10 ♀.
226. Line 21. For "female" read "male".
227. Line 16. Zawita and Rayat are in Iraqi Kurdistan and not in Syria.
Melitaea perseae caucasica Stgr. Insert as synonym:—*Mel. didyma* var. *kaschtschenkoi* Christoph, 1889, *Ent. Nachricht.* 15: 69. (See also page 217.)
230. Line 20. After "Syria" add: Bscharre, Nord Libanon, Kanisah.
233. *Melitaea deserticola* Obth. After Loc. Algeria add Biskra.
239. *Melitaea didymina* mod. *perplexa*. Lines 1 and 2 of description should read:—"I have only one specimen, a female, which differs from typical *didymina* in the constant development. . . ."
241. *Melitaea didymoides* mod. *latonia* after *seitzi* Matsumura, 1929, *Ill. Comm. Ins. Japan* add "List". After *eupatides* Fruhst., 1916, add [1917].
242. Line 8. For "*P. didymoides*" read "*M. didymoides*" and next line for the date "1906" read "1908".
244. *Melitaea ala bicolor* Seitz, for the date "1907" read "1908".
245. *Melitaea pseudoala* Shelj. The reference should read as follows:—1929, *Mitth. Münch. ent. Ges.* 19: 355. (Correction of date and volume.)

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248. *Melitaea chitralensis enarea* Fruhst. after 1916 add [1917].
250. *Melitaea sutschana* Stgr. add as synonym:—*Mel. didyma* var. *sibirica* Hopff. (in litt.) 1893 in Ruhl-Heyne, *Pal. Grossschmett.* : 394. Loc. Southern Amur.
269. Line 33. *Melitaea robertsi* Butl. For locality "Baluchistan" read "Kandahar".
271. Legend for fig. 125. For "lateral view" read "dorsal view".
277. Line 25. For "Dixful Mountains" read "Dizful Mountains".
285. *M. cinxia tchujaca* Seitz, for "1909" read "1908".
293. Lines 1 and 2. For "*elizabethae*" read "*elisabethae*".
302. Line 4. For "species" read "form".
Line 7 for "Stgr." read "Elwes".
312. *Melitaea diamina* Lang. Mr. Hemming has pointed out that the locality cited by Ernst for the figure of Lang's *diamina* is Vienna. It is clear, therefore, that the application of the name *diamina* Lang to the pale race of the south-western Alps involves a serious error. Although the figure in question shows a pale underside, and it may be drawn from a faded specimen, it must belong to the central European race. The name *diamina* Lang must be used for this race in place of *hebe* Borkhausen, and the latter may be treated as a true synonym, while Fruhstorfer's *alpestris* is available for the pale mountain race of the south-west. Unfortunately this involves fundamental changes in the nomenclature, as the central European race will become the typical subspecies, with Vienna as the locality of the type.
The nomenclature and synonymy of the Catalogue are to be corrected as follows :—
 1. *Melitaea diamina* Lang. The central European race, with the underside relatively dark.
Pap. diamina Lang, 1789. Loc. Vienna.
Pap. dictynna Esp. 1777 nec *Pap. dictynna* W.V. 1775.
Pap. hebe Borkh. 1793 nom. nov. pro *Pap. dictynna* Esp. preocc. etc. *orientalpestris* Verity and *aurelita* Fruhst. (*wheeleri* Chapm.) are to be treated as modifications of this subspecies.
 2. *Mel. diamina alpestris* Fruhst. The mountain form of south-western Europe with pale underside.
M. diamina alpestris Fruhst. 1917. Loc. Southern Switzerland.
vernetensis Rondou is to be treated as a modification of this subspecies.
318. *Melitaea diamina* mod. *wheeleri* Chapman. Delete "*wheeleri* Chapm." and insert "*aurelita* Fruhst." For the reference following read :—*M. dictynna* var. *wheeleri* Chapman, 1910, nec *Melitaea wheeleri* Hy. Edwards, 1881, *Papilio* 1 : 52.
334. Heading *Melitaea phoebe* mod. *changaica* Seitz, Pl. 14, delete fig. 9 ♀. In reference, for the date "1909" read "1908".
339. *alataurica*. Lines 2 and 3. Delete the sentence "Probably referable to *sibina*" and insert :—Some of the black discal spots on the under surface of the hind-wing are represented by striae. There are two specimens of this form in the British Museum, and it may be regarded as *forma alicujus loci*.
alternans. In reference for the date "1909" read "1908".

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340. *M. phoebe gerinia* Fruhst. after the date 1916 insert [1917].
Line 40. For "*menelik* Higgins" read "*gaisericus* Hemming".
342. Line 36. For "*tartara*" read "*tatara*".
M. phoebe tungana Seitz, for "1909" read "1908".
M. phoebe tungusa Herz, after the date 1898 insert [1899].
346. Line 22, heading. For "*algerica* Ruhl" read "*algorica* Heyne", and correct spelling in the following text.
347. *Melitaea sibina* Alpheraky heading, Plate 15, fig. 6 for "♂" read "♀".
351. Legend below figures. For "*turcmanica*" read "*turkmanica* Higgins".
352. Lines 1, 2 and 3 should read :—The rest of the fore-wing not unlike that of *phoebe*. On the hind-wing the median band consists of a complete series of heavy black spots.
Lines 13 and 16. For "olive-fuscous" read "olive-sulphur".
354. Line 6. For "Kuh-Deeshk" read "Sineh Safid" by Brandt.
356. Legend to Plate 4 fig. 8. For "paratype" read "type". This specimen is now in the British Museum (Nat. Hist.).
360. Legend to Plate 14 fig. 8. For "*mandarina* Bang-Haas" read "*mandarina* Seitz".
363. Index. Add :—*microtauricus* Belter (*perseae*), 226.

A NOTE ON THE IDENTITY OF CERTAIN TACHINIDAE (DIPT.)

By J. C. M. GARDNER, F.R.E.S.

IN 1940, *Indian Forest Records* (n.s.) *Ent.* 6 (7), I described (: 238) a puparium as that of *Sturmia atropivora* R.-D., the associated adult having been so identified by Dr. Baranoff. Owing to a suspicion that *S. chatterjeei* Curran might be a synonym of *S. atropivora*, I asked Mr. A. H. Khan to look into the matter. His opinion is that the specimen seen by Baranoff is identical with other specimens determined by the same authority as *Bactromyia fransseni* Bar.¹; the puparia also appear to be identical. The puparium described (No. 15) is therefore not of *S. atropivora* but of *B. fransseni*, which parasitises *Margaronia laticostalis* Guénee but not SPHINGIDAE.

Curran (1933, *Stylops* 2 : 46) described *Sturmia chatterjeei* from eight specimens from a series of fifty-two that emerged from one Sphingid larva. I have sent examples from this series to Dr. van Emden, and in his opinion *chatterjeei* Curran and *atropivora* R.-D. are conspecific.²

In the paper cited above, I pointed out (: 241) that two kinds of puparia (27A, 27B) were associated with adults identified by Baranoff as *Sturmia sericariae* Corn. Dr. van Emden has kindly examined the adults and pronounces those from my puparia 27B to be *Sturmia jacobsoni* Towns.

¹ Mr. Gardner has sent me the specimen in order to obtain my view on it. The *Carcelia*-like head with glabrous eyes, the 1-1-1 sternopleurals, the 3-4 setulae at the base of r_{4+5} , the narrow black vittae of the mesonotum, etc., make it quite certain that this is *Bactromyia fransseni* Bar., and that the identification by Dr. Baranoff as *Sturmia atropivora* must be due to an error in labelling the specimen. It was a unique specimen and the only fly thus identified in the collection concerned, and it was named in 1938, several years after *B. fransseni* had been described (F. v. EMDEN).

² The male genitalia of specimens of *chatterjeei* sent by Mr. Gardner, paratype of *masakensis* Curran (1927, *Bull. ent. Res.* 18 : 117), *atropivora* (Baranoff det.) with one anterodorsal seta on the mid tibiae, from Kuala Lumpur, and *atropivora* (Villeneuve det.) with two anterodorsals, from Cairo, are identical. From Cairo a fairly large series of *atropivora* is at hand, and though the majority have two anterodorsals, several specimens have only one on one or both middle legs. On the other hand, all the specimens in the British Museum (Natural History) from Ceylon, Mandalay, and Dehra Dun (named *atropivora* by Baranoff, Sir Guy Marshall and myself) have only one seta, the only specimen from Pusa two, and four of the six specimens from Malaya one. Specimens with the latter character are thus apparently much more common in the Oriental than in the Palaearctic region (F. v. EMDEN).

BOOK NOTICE.

A classification of the larvae and adults of the genus *Phyllophaga* (Coleoptera : SCARABAEIDAE). By A. G. BÖVING (*Mem. ent. Soc. Wash.* 2 : 1-96, text illust.). 8vo. Washington, 1942.

The main problem of the investigation dealt with in this book is an enquiry into whether or not in a large genus of beetles the specific classification of the adults and of the larvae will coincide, notwithstanding the fact that the two classifications are based on entirely different structural characters.

The result has proved that the classification of the larva of *Phyllophaga* and that of the adults does agree.

The work is in sections entitled :

- I. The external morphology of the larvae of *Phyllophaga*.
- II. Classification of the tribe Melolonthini on larval characters.
- III. Diagnosis of the genus *Phyllophaga* by larval characters.
- IV. Classification of species of *Phyllophaga* by larval characters.
- V. Classification of groups of species of *Phyllophaga* by adult characters.
- VI. Classification of groups of species of *Phyllophaga* by association of larval and adult characters.

A glossary of terms and a list of the literature quoted is given at the end. Following the text is a series of figures printed on pages 74-95 and arranged to form 11 plates.

An interesting feature of the descriptions of the larval stages is the selection of a "typical sample" from the material studied, and full details of such specimens is given. Most of the material is in the United States National Museum.

DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA)¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

Conosoma nigerrimum sp. n.

Shining, black, the posterior margins of the thorax and tergites narrowly rufescent. Antennae yellow, the 3rd to 10th segments infusate. Legs reddish-yellow. Length 5 mm. (abdomen extended).

Of exactly the same build and antennal structure of *ceylanense* Kr., the fore-parts scarcely differing in puncturation and pubescence, but at once distinguished by the much more densely punctured and pubescent abdomen and shorter setae. The colour of the whole insect also is distinctly blacker.

UNITED PROVINCES. Dehra Dun. Unique. My collection.

Tachinus limbicollis sp. n.

Rather shining, black, the anterior and posterior margins of the thorax narrowly, the lateral margins more broadly yellow especially behind; elytra with a small oval yellow spot at the shoulders, the posterior margin very narrowly and obscurely yellow, the posterior margins of the tergites very narrowly and obscurely yellowish. Antennae black, the first two segments reddish-yellow. Legs reddish-yellow, the tibiae slightly infusate. Length 5.5 mm.

Build and antennal structure of *piceus* Cam. but blacker, the yellow markings more sharply defined, that of the lateral margin of the thorax narrower in front, the ground sculpture of the head and thorax quite different, transverse and wavy and with distinct though small and scattered punctures; the sculpture of the elytra scarcely differs in the two species, but the abdomen is much more closely punctured and the ground sculpture stronger.

DARJEELING: Ghum district: Mangpu. A single specimen in my collection.

Tachinus ornatus sp. n.

Shining black, the anterior and posterior margins of the thorax narrowly, the sides broadly (especially behind) yellow; the elytra with a large yellow marking on each disc and the posterior margin narrowly yellow; abdomen with the posterior margins of the tergites yellow. Antennae black, the 1st segment yellow, the 2nd brownish-yellow. Legs yellow. Length 4.75 mm.

Build of *himalayicus* Cam. but differently coloured, the antennae longer and more slender, the head and thorax more punctured. Head very finely, moderately closely punctured. Antennae with the 3rd segment a little longer than the 2nd, 4th to 7th longer than broad, decreasing in length, 8th to 10th about as long as broad. Thorax transverse (4.3 : 2.75), the sides rounded and more retracted towards the front, finely and closely punctured. Elytra longer (4.5 : 2.75) and broader than the thorax, slightly broader than long, the puncturation very similar. Abdomen narrowed towards the apex, closely and finely punctured.

♂. 8th tergite with four stout triangular processes, the median pair longer than the lateral and separated from each other by an acute excision, the apex of each with three short setae, the lateral each with a longer black seta: 5th sternite with broad parallel-sided excision in the middle, at its anterior border with a semilunar impression, its fundus granular; the truncate posterior margin of the segment on each side of the excision with five

¹ Continued from 1944, *Proc. R. ent. Soc. Lond.* (B) 13: 15.

rather long, closely placed, equal yellow spines, the adjacent surface granular and externally with a long black seta : 6th with four processes each with a long black seta at the apex, the lateral acute, short, the median pair longer and broader, separated from each other by an acute triangular excision.

DARJEELING : Ghum district : Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

***Hypocyptus championi* sp. n.**

Shining, head, thorax and elytra reddish-yellow, abdomen pitchy black, the last two segments reddish-yellow. Antennae and legs reddish-yellow. Length 1 mm.

Size and build and with the antennal structure of *indicus* Cam. but of different colour and shorter elytra, the thorax a little less closely punctured and without ground sculpture; elytra shorter, more transverse (5 : 3), extremely finely and much less closely punctured, the ground sculpture scarcely visible; abdomen extremely finely punctured, the ground sculpture extremely fine, reticulate.

UNITED PROVINCES : Nainital : altitude 7000–8600 feet, vii.1923 (*H. G. Champion*). Type in British Museum (Natural History).

***Hypocyptus indicus* sp. n.**

Shining, black, the lateral margins of the thorax narrowly yellowish (by translucency), the posterior margins of the 5th and 6th visible tergites sometimes reddish. Antennae and legs reddish-yellow. Length 1 mm.

In build, colour and with the antennal structure of *laeviusculus* Mannerh. but with the punctures of the thorax not quite so close and the ground sculpture much less evident, scarcely visible, the puncturation of the elytra much stronger but less close than in that species, more shining, the ground sculpture also less distinct; puncturation of abdomen not quite so fine, ground sculpture scarcely visible. The pubescence throughout longer and coarser.

KUMAON : Dudhatali, altitude 8000–10,000 feet (*H. G. Champion*). Type in British Museum (Natural History).

***Paracyptus* gen. n.**

Build of *Hypocyptus* Mannerh. but at once distinguished from all the *Hypocyptini* by the very long and slender 4th segment of the maxillary palpi. These are long, the 2nd and 3rd segments elongate, of equal length, the 4th very long and slender, distinctly longer than the 3rd and acutely pointed. Tarsi 4-segmented. Owing to lack of material for dissection further details are not available.

Type of the genus, the following species.

***Paracyptus glaberrimus* sp. n.**

Very convex, ovate shining, dark ferruginous red (almost black), the abdomen with the posterior margins of the last two segments narrowly and obscurely reddish-yellow. Antennae and legs reddish-yellow. Length 0.75 mm.

In build much like *Hypocyptus seminulum* Er. but the antennae more slender and the whole insect without sculpture and except for a few fine hairs at the sides of the abdomen devoid of pubescence. Antennae with the first two segments stout, the 2nd twice as long as the 1st, 3rd to 7th slender, each a little longer than broad but decreasing in length, the 7th only slightly longer than broad, 8th to 10th much stouter, forming a club, 8th and 9th a little longer than broad, the 9th stouter than the 8th, 10th not quite so long as the 8th and

9th together. Thorax transverse (4.5 : 3), the sides rounded, retracted in front, the posterior angles and base rounded. Elytra as long as, and slightly broader than the thorax, transverse (5 : 3), the sides and posterior angles rounded. Abdomen narrowed from base to apex, the sides narrowly margined.

DARJEELING : Ghum district. Unique. Type in my collection.

Myllaena kashmirica sp. n.

Myllaena infuscata Cam., 1939, *Faun. Brit. Ind.* 1 (4) : 20 (nec Kr.).

This species is distinct from *infuscata* Kr. in the following respects : of larger size and more robust build, slightly larger than *minuta* Kr., from which it differs in the blacker colour, longer, stouter antennae, the penultimate segments distinctly longer, the thorax with the puncturation not so close and not at all granular, the elytra distinctly less finely punctured, the abdomen less finely and less densely punctured, the pubescence coarser than in either of the above-mentioned species. From *intermedia* Er. it differs in the smaller size, narrower build, shorter thorax, shorter, stouter antennae, the penultimate segments distinctly shorter, shorter less finely punctured elytra, less densely punctured and pubescent abdomen.

Type in my collection.

Placusa (s.str.) rufoflava sp. n.

Moderately shining, the head dark reddish-brown, thorax and abdomen reddish-yellow, the bases of the 4th and 5th visible tergites infusate, elytra brownish-yellow. Antennae reddish-yellow, the penultimate segments slightly infusate. Legs reddish-yellow. Length 1.75 mm.

A small brightly coloured species of the size and build of *pygmaea* Kr. but differing in the colour, stouter antennae, more finely and less closely punctured head, thorax and abdomen, the elytra, however, scarcely differing from that species in sculpture. Penultimate segments of antennae about three times broader than long, the 11th distinctly longer than in *pygmaea*; ground sculpture of fore-parts absent, that of the abdomen reticulate, finer than in that species. The specimens before me show no sexual characters.

CENTRAL PROVINCES, iv.1923. Type in my collection.

Falagria (Stenagria) chakratana sp. n.

Head and thorax black, greasy lustrous, elytra and abdomen shining, the former dark brown with the base reddish-yellow, the latter black with the first visible tergite yellow. Antennae blackish, the first two segments reddish-yellow. Legs reddish-yellow, the femora and tibiae more or less infusate. Length 4 mm.

Size and build of *longiceps* Cain. but with differently coloured and slightly longer antennae, the penultimate segments longer, the sculpture of the head of similar character but a little coarser, the lustre similar; thorax more shining, the sculpture much weaker than in *longiceps*, finely coriaceous; elytra with fine and sparing puncturation, not quite so fine as in that species; abdomen very finely and very sparingly punctured on the first three visible tergites, much more closely on the 4th and 5th; ground sculpture absent.

CHAKRATA DISTRICT : Khedar Khud, altitude 7500 feet. Type in my collection.

Falagria (Stenagria) semipollita sp. n.

Head and thorax greasy lustrous, black; elytra and abdomen shining, the former brownish-yellow, sometimes slightly infusate about the scutellum, the latter black with

the posterior margins of the tergites narrowly rufescent. Antennae dark reddish-brown, the first two segments lighter. Legs yellowish-red, the femora slightly infusate. Length 4.5 mm.

Near *longiceps* Cam. Very similar in colour and lustre, but with broader less pear-shaped head and broader thorax, the elytra yet more finely punctured. Head slightly longer than broad, suborbicular, impressed between the antennae, strongly coriaceous and impunctate. Antennae long, all the segments distinctly longer than broad, the penultimate about twice as long as broad. Thorax longer than broad (5:4), narrowly sulcate along the middle, closely covered with small granules, impunctate. Elytra as long as but broader than the thorax, extremely finely, rather closely punctured, the ground sculpture scarcely visible. Abdomen finely and rather closely punctured and with very fine ground sculpture.

CHAKRATA DISTRICT: Dodora Khud, Chulli Khud, Binal Gad, altitude 7000-8000 feet. Type in my collection.

***Falagria (Anaulacaspis) almorensis* sp. n.**

Shining, head and thorax dark reddish-brown; elytra brownish-yellow, broadly infusate across the middle; abdomen black, the posterior margin of the first visible tergite broadly, the following more narrowly reddish-yellow. Antennae black, the 1st, 2nd and 10th and 11th segments reddish. Legs reddish-yellow. Length 3 mm.

Somewhat resembling *subrugosa* Kr. in build, but of darker colour, the antennae similarly constructed, but with the head less transverse, rounder, the eyes much smaller, the puncturation of the head and thorax less fine and closer, elytra very finely, moderately closely and uniformly punctured throughout, abdomen much more closely punctured. The whole insect without ground sculpture.

W. ALMORA: Dhauli Ganga. Type in my collection.

***Myrmecopora (Ilyusa) elegans* sp. n.**

Shining; head ferruginous red, thorax and elytra bright reddish-yellow, the latter with the scutellary region infusate and a large indeterminate fuscous marking extending from the reflexed margin nearly to the suture; abdomen with the first two visible tergites, the posterior margin of the 5th and whole of the 6th reddish-yellow. Antennae reddish, the first four or five segments and legs reddish-yellow. Length 2.3 mm.

Build of *fugax* Er. but much smaller and differently coloured. Head transverse, subquadrate, as broad as the thorax, the posterior angles rounded, the disc finely, moderately closely punctured, the base and front practically impunctate; ground sculpture absent. Antennae with the 3rd segment a little shorter than the 2nd, 4th a little longer than broad, 5th to 10th gradually more transverse, the penultimate segments fully a half broader than long. Thorax scarcely transverse, the sides rounded in front, distinctly retracted behind, before the scutellum with a small impression or with the posterior two-thirds of the disc superficially impressed (?), on the disc punctured like the head, elsewhere nearly impunctate and without ground sculpture. Elytra a good deal broader and a little longer than the thorax, broader than long, more finely, moderately closely punctured. Abdomen narrowed towards the apex, very finely moderately closely punctured and without ground sculpture.

PUNJAB: Lyallpur. Under dead leaves on moist soil (*Ghani*). Type in British Museum (Nat. Hist.).

ON EROTYLID BEETLES BELONGING TO *SPONDOTRIPLAX* AND SOME ALLIED GENERA, WITH DESCRIPTIONS OF A FEW NEW SPECIES (COLEOPTERA)

By Gilbert J. ARROW, F.Z.S., F.R.E.S.

British Museum (Natural History).

THE genus *Spondotriplax* Crotch, which contains numerous species of small beetles in India and the Malayan and Papuan Regions, illustrates in a striking manner the association between geographical distribution and coloration. All species from the Indo-malayan Region at present known exhibit patterns of strongly contrasted black and red or yellow, often almost identical with those found in beetles from the same region belonging to another subfamily, the DACNINAE. Similar patterns are unknown in any species of the genus from the Papuan Region. In these the head, legs and lower surface are commonly pale, in strong contrast with the dark elytra, while the anterior and posterior halves of the body may be light and dark respectively. Blue or metallic colours in the Papuan species generally replace the black ground colour of most Indo-malayan representatives. These colour characteristics are shared with many little beetles of different genera found in the same region, e.g. COCCINELLIDAE and HALTICIDAE.

The structural differences between the species of *Spondotriplax* are very slight indeed. Dr. Heller (1920, *Archiv f. Nat.* **84**, A8 : 28) has proposed a new genus, *Neotritoma*, to which all but the type-species of *Spondotriplax* (*quadrimaculata* Kirsch = *endomychoides* Crotch) are to be transferred on account of the greater width of the last joint of the maxillary palpi in that species but, in view of the varying proportions of the joint, this seems to me quite unnecessary. Another genus, *Rhopalotritoma* Heller, although not associated by its author with *Spondotriplax*, appears to me to be hardly separable and I have provisionally included the only species (*amabilis* Heller) in the table which follows. The 5-jointed antennal club, as figured and described, certainly points to this rather than to its association with *Cyrtomorphoides*, as preferred by Dr. Heller, and the figure shows an insect almost identical in pattern with *S. diaperina* Gorham.

Dr. Heller has called the club of the antenna of *Rhopalotritoma* 5-jointed and that of *Spondotriplax* 4-jointed, but, as the 7th joint is distinctly transverse in all cases, I can find no reason for such a distinction and regard the club as a 5-jointed one.

S. reibenspiessii Mader I believe to be identical with *S. cyanecula* Crotch and, after examination of fairly numerous specimens, I consider the Bornean *S. propinqua* Arrow best treated as a variety of the Sumatran *S. exquisita* Arrow. Two species recently ascribed to the genus, viz., *S. jucunda* Mader and *S. flavofasciata* Araki, are unknown to me, as is *Neotritoma monticola* Heller, but the characters described and figured appearing sufficient to assign their correct position in the table of species at the end of this paper, I have ventured to include in it the first and third of these.

The genus *Hedista* Weise (1926, *Ark. Zool.* **18**, no. 34 : 33), formed for *H.* PROC. R. ENT. SOC. LOND. (B) 13. PTS. 5-6. (JUNE 1944.)

tricolor Weise from North Queensland, is also unknown to me, but it is evidently nearly related to *Spondotriplax* and very likely inseparable from it.

The genus *Camptotritoma* Heller differs from *Spondotriplax* Crotch more obviously in the broadly dilated tibiae than in the union in front of the elevated prosternal lines, which form a triangle. The latter distinction, the only one mentioned by Dr. Heller, is incorrectly represented in his illustrative diagram, in which these lines do not, as stated, extend past the middle. It seems possible that this structure of the prosternum may be attained independently in species not closely related and is therefore not a truly generic feature. An almost similar structure is found in *Spondotriplax metallica*, although in other respects it seems to have little resemblance to *Camptotritoma fulva* Heller. A second species of *Camptotritoma* is now described.

The new genus *Helcocerus*, described here, is not very closely related to any other at present known, although belonging to this group of genera.

***Helcocerus* gen. n.**

Elongate-oval, very convex, with short antennae and legs. Eyes not very small, finely faceted. Antennae stout and compact, joint 1 large, almost globular, 2 globular, 3 about twice as long as broad, 4-8 short and very closely articulated, forming an arc, 9-11 very broadly transverse. Maxillary palpi with the terminal joint twice as broad as long. Mentum with acutely triangular anterior process, the labial palpi very short, the last joint rather large, oval.

Pronotum with short basal lobe, scutellum small, about as long as broad, the apex sharp. Prosternum excavated on each side and compressed in front to form a short, stout anterior process, the tangential lines long and almost meeting in front; mesosternum with a semicircular raised line; metasternal lines reaching the episterna and abdominal lines almost reaching the base of the first ventral sternite.

Tibiae triangular, very broad at the end; tarsi short, broad and hairy beneath.

Genotype the following species:—

***Helcocerus saundersi* sp. n.**

Brownish-black above, with the head, antennae, legs and lower surface ferruginous.

Head finely punctured in front, almost smooth behind. Pronotum very finely and sparsely punctured, a little more strongly at the sides, with the lateral margins gently rounded, the front angles not very sharp, the hind angles very obtuse, the base broadly lobed in the middle with a row of elongate marginal punctures on each side. Elytra with a juxta-sutural stria upon the posterior half and six longitudinal rows of rather strong punctures, the first row feebler than the rest and the 6th abbreviated in front and behind. Prosternum almost smooth, metasternum and abdomen minutely and not closely punctured.

Length 3-3.5 mm.

MALAY PENINSULA: Singapore (C. J. Saunders, July).

Five specimens were found in fungi.

The very peculiar antennae will enable this genus to be identified at once. They are very short and stout, with the 3rd joint alone distinctly elongate, the 4th to 11th transverse and the last three forming a broad club. The 4th and following joints are not in line with the preceding three. Joints 4 to 8 have little or no power of separate movement, being closely connected together and attached to the 3rd not at its extremity but a little to the side, making together a nearly semicircular arc. The last three joints form a broad club.

Another feature separating the genus from the rest of the Tritomini is the production of the prosternum in front to form a short and very stout process. The tibiae are strongly dilated at the end, the breadth of the two anterior pairs being nearly half their length. The hind tibiae are a little longer.

H. saundersi is dark above, with the head, the sides of the pronotum and the shoulders and apices of the elytra generally vaguely reddish. The upper surface is very smooth and shining, lightly punctured, except upon the elytra, which bear rather well-marked rows of punctures. The club of the antenna is clothed with pale hairs.

***Camptotritoma papuana* sp. n.**

Greenish-black above, with the pronotum yellowish-brown, the legs and lower surface testaceous, the six basal joints of the antenna yellow and the last five joints greyish-black.

Oval, convex, very smooth and glossy, with the head finely and sparsely punctured and the pronotum very minutely, the sides of the latter feebly curved, the front angles rather and the hind angles very blunt, the scutellum short and broad, the elytra bearing seven longitudinal rows of small punctures, placed rather far apart and vanishing before the apex, the first row replaced behind the middle by a fine juxta sutural stria. Lower surface very smooth, almost unpunctured, the prosternal triangle extending to a little behind the front margin, its apex semicircular; mesosternum with an incised arcuate line reaching to about the middle. Legs short, the tibiae broadly dilated at the apex. Antennae with the third joint almost as long as the three following and the last five forming a rather broad club, clothed with conspicuous yellow hair.

Length 3.5 mm.

EASTERN NEW GUINEA : Kokoda, 1200 ft. (*Miss L. E. Cheesman*, May).

A single specimen was found in a fungus.

Camptotritoma was characterised by Heller for two Philippine species to which the present one appears to be nearly related. It differs from the type-species, *C. fulva* Heller, in its dark feebly metallic greenish-black colour and very glossy surface above and beneath. The intervals between the rows of rather widely separated elytral punctures are hardly perceptibly punctured. In *C. fulva* the puncturation is no doubt of a kind intermediate between the "crebre" of the Latin diagnosis and the "zerstreut" of the German description. The head in *C. papuana* is very finely and sparsely punctured and the lower surface of the body is almost unpunctured. The breadth of the hind tibia at its extremity is nearly equal to one-third of its length.

***Spondotriplax antennalis* sp. n.**

Black, with the elytra deep blue or purple, the abdomen and the tarsi and footstalk of the antennae reddish-testaceous, joints 7 and 8 of the latter black and the three terminal joints very pale yellow, the 9th joint generally dark at the base.

Broadly oval, very smooth and shining, the head not very closely nor very finely punctured, the pronotum bearing very fine scattered punctures, its sides almost straight, the front angles fairly sharp and hind angles blunt, the elytra bearing seven rows of fine inconspicuous punctures, the innermost row only present in front and all disappearing before the apex. The third joint of the antenna is almost as long as the following three together and the club is rather broad. The elevated lines of the prosternum are very short and far apart and the metasternum bears fine scattered punctures.

Length 3.5-4 mm.

EASTERN NEW GUINEA : Kokoda, 1200 ft. (*Miss L. E. Cheesman*, May; August). MYSOL (*A. Russel Wallace*).

Several specimens were found by Miss Cheesman in fungi.

The species is similar in its form and coloration to *S. cyanecula* Crotch but differs conspicuously in its dark head and legs and especially in the extremely pale terminal part of the antenna, in which it is unlike any other known species. The colouring is rather variable. The head and pronotum may show a slight metallic lustre and the elytra vary from blue to nearly black. The colour of the legs is also rather inconstant. They are generally dark but the tarsi are pale and sometimes the tibiae also.

Spondotriplax metallica sp. n.

Testaceous-yellow, with the pronotum and elytra metallic greenish-black, the club of the antenna, except its tip, black and sometimes also the sides or the whole of the sternum.

Rather narrowly oval and very convex, with slender legs and antennae, the third joint of the latter nearly as long as the three following and the club not very broad. The head bears numerous not very fine punctures. The pronotum is more finely and rather less closely punctured, its sides are almost straight, the angles rather blunt and the angle-pores well marked. The elytra bear seven rows of fine punctures, the juxta-sutural row changing to a fine stria behind. The raised lines of the prosternum are long and convergent, almost meeting in front, and the metasternum bears only a very few scattered punctures.

Length 3.5 mm.

EASTERN NEW GUINEA : Kokoda, 1200 ft. (Miss L. E. Cheesman, May).

Numerous specimens were found in fungi.

Like *S. cyanecula* Crotch, this exhibits the peculiarity of a pale head and legs contrasted with dark pronotum and elytra. It is a rather smaller and distinctly more narrowly oval insect than that of *S. antennalis* and the elytra, though more metallic, are of a less lively colour. The antennae and legs are a little more slender and the antennal club is a little narrower.

In conclusion I append a key to the species of *Spondotriplax*, omitting only *S. flavofasciata* Araki, the description of which is not accessible, and a list of the species, 18 in all, of which only three are included in the genus in the catalogue of EROTYLIDAE by Kuhnt (W. Junk, 1911).

- | | |
|--|-------------------------------|
| 1(20). Elytra spotted or banded | (Indo-malayan spp.). |
| 2 (5). Body red with black spots. | |
| 3 (4). Elytra with two black spots | <i>quadrimaculata</i> Kirsch. |
| 4 (3). Elytra with more than two black spots | <i>andamana</i> Arrow. |
| 5 (2). Not red with black spots. | |
| 6 (9). Shoulders of the elytra black. | |
| 7 (8). Antennal joint 3 shorter than 4 and 5 together . . . | <i>amabilis</i> Heller. |
| 8 (7). Antennal joint 3 longer than 4 and 5 together . . . | <i>diaperina</i> Gorham. |
| 9 (6). Shoulders of elytra not black. | |
| 10(11). Elytra with four large red or yellow spots | <i>exquisita</i> Arrow. |
| 11(10). Elytra not four-spotted. | |
| 12(17). Head dark. | |
| 13(14). Pronotum very feebly punctured | <i>javana</i> Arrow. |
| 14(13). Pronotum distinctly punctured. | |
| 15(16). Post-median pale band narrow | <i>soror</i> Arrow. |
| 16(15). Post-median pale band broad | <i>monticola</i> Heller. |
| 17(12). Head pale. | |
| 18(19). Anterior and posterior pale elytral marks converging . . | <i>fulviceps</i> Arrow. |
| 19(18). Anterior and posterior pale elytral marks far apart . . | <i>pallidipes</i> Arrow. |
| 20 (1). Elytra not spotted or banded (Papuan species). | |

- 21(24). Head dark.
 22(23). Elytra very lightly punctured *antennalis* sp. n.
 23(22). Elytra strongly punctured *cyaneipennis* Wat.
 24(21). Head pale.
 25(26). Elytra with pale extremities *jucunda* Mader.
 26(25). Elytra without pale extremities.
 27(30). Pronotum pale.
 28(29). Elytra black (brown, red or yellow when immature) . . . *laratina* Arrow.
 29(28). Elytra green or blue *ceramensis* Crotch.
 30(27). Pronotum dark.
 31(32). Broadly oval : elytra blue or green *cyanecula* Crotch.
 32(31). Narrowly oval : pronotum and elytra steely-black . . . *metallica* sp. n.

List of the species of *Spondotriplax* Crotch.

syn. *Neotritoma* Heller, 1920, *Arch. f. Nat.* **84** (A) : 41.
Rhopalotritoma id., *op. cit.* : 27.

- amabilis* Heller (*Rhopalotritoma*), *op. cit.* : 41.
andamana Arrow, 1925, *Fauna of India, Erotylidae, etc.* : 144.
antennalis sp. n.
ceramensis Crotch, 1876, *Cistula Ent.* **1** : 469.
cyanecula Crotch, *loc. cit.*
reibenspiesi Mader, 1936, *Ent. Rund.* **54** : 113.
cyaneipennis Wat. (*Aulacochilus*), 1894, *Ann. Mag. nat. Hist.* (6) **13** : 71.
diaperina Gorh. (*Cyrtotriplax*), 1896, *Ann. Mus. Civ. Gen.* **36** : 290.
exquisita Arrow, 1926, *Ent. Mitt.* **15** : 260.
 var. *propinqua* Arrow, *op. cit.* : 356.
flavofasciata Araki, 1941, *Trans. Kansai Ent. Soc.* **11** : 56.
fulviceps Arrow, 1925, *Fauna of India, Erotylidae, etc.* : 144.
javana Arrow (*Neotritoma*), 1923, *Treubia* **3** : 273.
jucunda Mader, 1936, *Ent. Rund.* **54** : 113.
laratina Arrow, 1926, *Ent. Mitt.* **15** : 356.
metallica sp. n.
monticola Heller (*Neotritoma*), 1920, *Arch. f. Nat.* **84** (A) : 45.
pallidipes Arrow, 1928, *Faune des Colonies françaises, Coleopt. Erotyl.* : 341.
quadrinaculata Kirsch (*Cyrtomorphus*), 1875, *Mitt. Zool. Mus. Dresden* **1** : 57.
endomychoides Crotch, 1876, *Cistula Ent.* **1** : 469.
soror Arrow, 1925, *Fauna of India, Erotylidae, etc.* : 143.

The types of the four new species described are all in the British Museum (Natural History).

THE SIGNIFICANCE OF VESTIGIAL OBLIQUE VEINS IN THE EVOLUTION OF INTERCALATED VEINS IN THE ODONATE WING, WITH THE DESCRIPTION OF A NEW GENUS

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

WHILST examining under the microscope the minor details of venation in the wings of a *Lestes sponsa* Hansen, I was interested to notice in one of the wings that the intercalated vein IRiii was disconnected at its base. Instead of joining Rii + iii as is usual in the Lestine venation, it ended blindly in the membrane extending between that vein and Riv + v, very much in the same way as do many intercalated veins in the EPHEMERIDAE. I naturally mistook this unusual formation to be a defect in the venation, but when a large number of wings had been examined I found that a similar break in the vein was present in 5 per cent. It was obvious that such a high percentage entirely ruled out any possibility of accidental defects and that some other reason for this formation must be looked for.

Needham holds that the vein IRiii is a composite one, its distal half representing the distal end of Rs and its inner a secondary "bridge-vein" which has been formed backwards from Rs to the base of the wing in order to strengthen the venation in this part. He has explained how, in the LESTINAE, the Radial sector after passing along Riii, crosses over to IRiii by the medium of an oblique vein and thereafter runs to the periphery of the wing. In the larval wing this is certainly true, for the trachea may be seen clearly taking such a course, but whether the trachea preceded the vein originally, or the vein the trachea, is still a matter for argument. The oblique vein, occupying approximately the same place, is invariably present in the wings of the LESTIDAE and is recognised by all systematists as a family character. According to Needham then, the distal end of IRiii was formed from the level of this oblique vein towards the periphery of the wing, whilst the proximal part of the intercalary was laid down in the opposite direction, viz., from the oblique vein towards the base of the wing. The failure of IRiii to make contact with the basal veins in some 5 per cent. of the wings clearly implies that Needham was correct in, at least, the latter half of his theory relating to the formation of the "bridge-vein."

Tillyard (1922, *Ent. News* 33 : 7), in discussing the formation of IRiii in the LESTIDAE, says : "It is certainly possible to prove from the fossil record that Needham's supposed bridge-vein was never formed backwards as a bridge-vein but was always the basal portion of a strongly formed main longitudinal vein arising from Riv + v or sometimes from Rii + iii as in most recent forms."

Now if IRiii were all that Tillyard claims it to be from fossil times, it is certain that its organisation would be fully crystallised and that it would originate from a constant source : Tillyard gives it two alternatives. I have made an analysis of the various endings of this vein in *Lestes* and find them to be as follows :—Attached to Rii + iii, 70% ; to Riv + v, 11% ; to the angle formed between these two same veins, 13% ; by a dichotomy of its end to these two veins, 1% ; and not attached to any veins, 5%. This evidence, then, goes to show that although there is a marked tendency for IRiii to establish a connection with Rii + iii (not to Riv + v as stated by Tillyard), this is by no

means constant, and the variability of the connections taken together with the failure, in some wings, of any connection to be established at all is hardly what one would expect to find in an organ claimed to have been established from fossil times, and, in my opinion, is sufficient proof that IRiii never originated from a basal source but extended inwards from a peripheral one: whether this was from the neighbourhood of the Lestine oblique vein or from the border of the wing still remains to be proved.

There are several "oblique cross-veins" in the wings of the Odonata, which are so constant in their occurrence and position as to have come to be regarded as either ordinal, familial or generic characters. Each of these, from its fixity, must have served or may still serve some important function in the stability of the wing, otherwise it would never have been preserved. In addition to the "Lestine oblique vein," the most important are: (1) a basal one known as the Anal-crossing (Ac), which served and still serves as a pathway

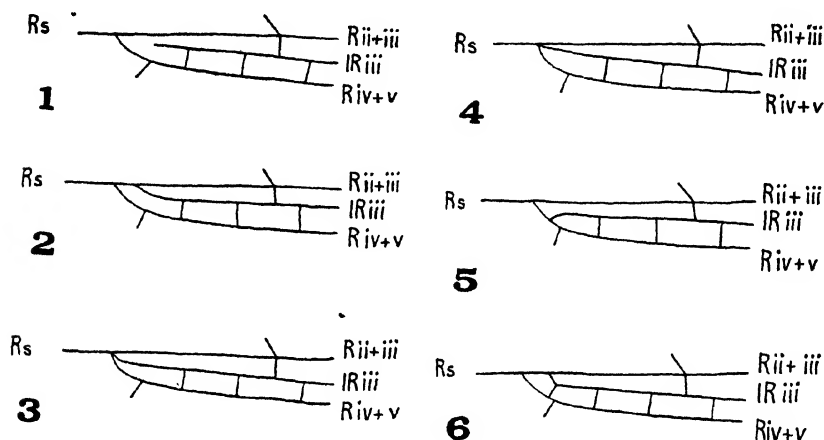


FIG. 1.—Variation in the attachment of the vein IRiii as seen in: 1. *Lestes dryas* Kirby; 2 to 6. *Lestes sponsa* Hans. Notation: Rs, Radial sector; Rii + iii, Riv + v branches of Radius; IRiii intercalated vein. (Tillyardian notation employed.)

for the Anal trachea to rejoin the distal portion of the Anal vein, and (2) a short oblique vein which extends from the postero-external or posterior angle of the discoidal cell to join the Anal vein. The first of these is too well known to require further description here; the second has not received the attention which it deserves. The Comstock-Needham venational theory describes the formation in this part of the wing as a bifurcation of the Cubitus into Cui and Cuii, the extreme base of the latter being the oblique vein now in question. Tillyard showed, however, by the fossil record, that the branch regarded by Needham as this vein is actually the Posterior branch (CuP) and that the supposed posterior branch of Needham (Cuii) is actually the Anal vein, which, having lost its basal connections, has been switched on to the Cubitus. The Anal vein, however, as I have shown (1938, *Proc. R. ent. Soc. Lond. (A)* 13: 60-70) is continued basally in the *Coenagriodea* beyond this point and ends by fusing with the posterior border of the wing; the apparent ending on CuP is actually an oblique vein connecting it to CuP and serves for the passage of a trachea from the latter to supply the distal portion of the Anal vein. Thus it will be seen that we have

here an exact parallel of the Lestine oblique-vein complex : this will be better appreciated in the following table which compares the respective and component parts of IRiii and the Anal vein :—

Distal portion of IRiii from the periphery of the wing to the level of the oblique vein connecting it with Riii.

Oblique vein linking IRiii and Riii.

Lestine bridge-vein running from the level of oblique vein to Rii + iii (or to Riv + v).¹

Distal portion of the Anal vein from periphery of the wing to the oblique vein connecting it with CuP.

Oblique vein linking the Anal vein with CuP.

Anal bridge-vein (Ac) linking the Anal vein with the posterior border of wing or to Ac.

The only difference to be noted between these two formations is that the Lestine bridge-vein is an original or primary one, whilst the Anal-bridge represents a reconstruction of the obsolete basal portion of the Anal vein and must therefore be regarded as of a secondary nature. The evolution, however, of the two formations may be shown to follow along exactly the same lines.

A study of the comparative anatomy of the intercalated veins throughout the Order Odonata serves to show how these veins originate in small beginnings at the periphery of the wing and gradually extend inwards until, ultimately, some of them, the most important for the stability of the wing, establish basal connections with one or other of the main primary veins. It also shows how they become *tracheated in sections*, at first near the middle of the wing, but ultimately from their basal connections. The medial tracheations are hall-marked for long periods and, perhaps for all time, by the presence of *oblique veins* which show where the tracheal supplies came into each completed section of the veins. An exhaustive review of the whole Order in this respect would take up too much space and would require too many text-figures, which for reasons of economy are impossible in these times, but the same result may be arrived at by selecting a few examples demonstrating the various stages in the evolution of the veins. I am most fortunate in this respect in having acquired from Dr. Schmidt, just prior to the outbreak of war, a meagre description but accompanied by a good wing photograph of a new genus and species of dragonfly very closely allied to the genus *Perilestes*, which latter stands right at the base of the family LESTIDÆ.¹ With the aid of this wing, I am able to give an almost complete chain illustrating the evolution of intercalated veins and of IRiii in particular in all of its three stages. I am not aware that a description of this new genus has been published yet, but as it occupies an important position in this paper, I have given in an appendix a short description of such details of it as are known to me, together with a figure of the wings.

COMPARATIVE ANATOMY OF THE INTERCALATED VEINS IRii AND IRiii.

IRii. The vein IRii is found in its most primitive form in the genus *Perilestes* and a progressive lengthening of the vein from the apex of the wing to as far basal as the level of the nodus is to be seen in a series of wings starting at this genus and ending up with the recent AGRIDÆ.

In *Perilestes stultus* and *attenuatus* it is only 4 cells in length and ends proximally at the level of the outer or inner end of the pterostigma. In *Perisolestes remotus* it has doubled in length, is now some 8 cells long and extends into 3 cells proximal of the pterostigma. Thus even in the horizon of a single

¹ See page 65.

subfamily we find evidence of an intercalated vein lengthening inwards from the periphery of the wing. In *Eolestes*, *Chorismagrion* and many species of *Lestes* the vein has lengthened to a point half-way between the pterostigma and nodus and is 14 or more cells long. In *Synlestes* it ends on Rii at a point considerably nearer the nodus than pterostigma, and finally, in the AGRIIDAE, it may actually reach the level of the nodus. No tracheation of this vein has been so far observed in the larval wing of any species. The inner end bifurcates,

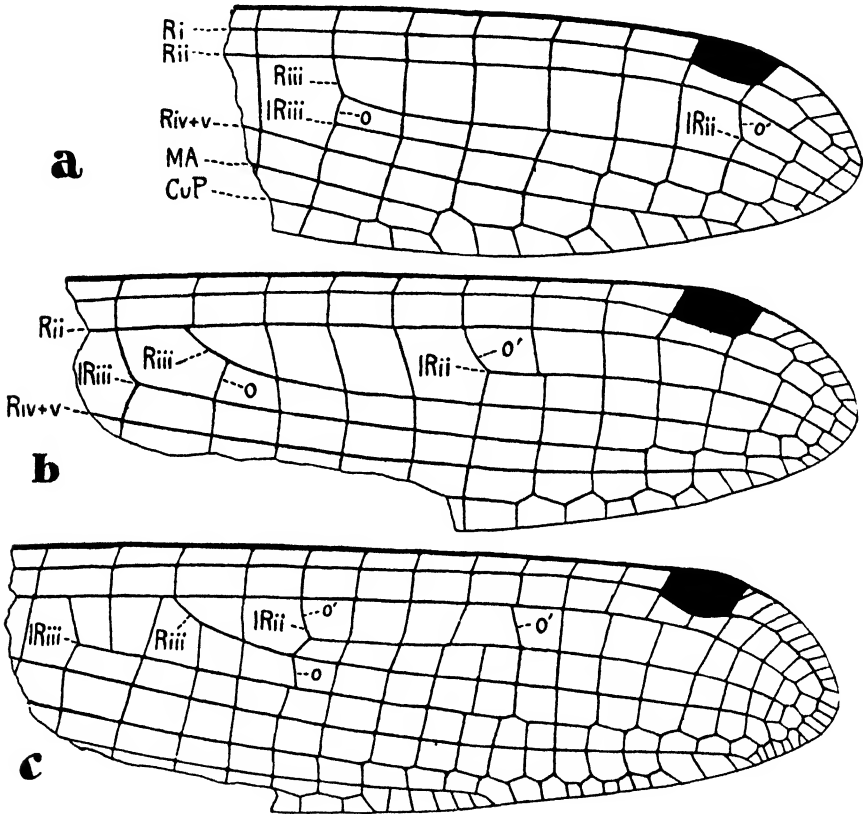


FIG. 2.—Development of the intercalated veins IRii and IRiii as seen in : a. *Perilestes solutus* Will.; b. *Perissolestes remotus* Will.; c. *Eolestes diotima* sp. n. (Schmidt MS.). Notation : Ri, Rii, Riii and Riv + v branches of Radius ; IRii and IRiii intercalated veins ; O, Lestine oblique vein ; O', oblique veins of IRii.

the anterior arm is nearly always the longest and joins Rii very obliquely as if it were tracheated from that vein. In *Philoganga* there are two or three oblique veins connecting Rii with IRii which are so constant in position and occurrence as to have come to be regarded as generic characters. These oblique veins suggest, in this genus, that IRii has developed in three sections, each oblique vein representing a former more primitive ending of the vein where a trachea from Rii grew into it. It is tracheation which "fixes" these oblique veins and I find it difficult to believe that unless the vein had established a permanent attachment to Rii or had become static over a long period, a tracheation would

be possible. Roving veins are no more likely to gather tracheae than rolling stones are to gather moss.

IRiii. The evolution of the vein IRiii is somewhat similar to that of IRii, but in no species of Odonata is it found to be as primitive as the latter is in the genus *Perilestes*. It extends, however, for a greater distance into the wing and there is definite evidence that a sectional development such as I have suggested may have occurred in the case of IRii in *Philoganga*.

In the genus *Perilestes* the species *solutus* and *attenuatus* have the vein of the same length as Riii, whilst in *Perissolestes remotus* it extends for 1 or 2 cells beyond that vein: its end is oblique and, in addition, there is frequently a more

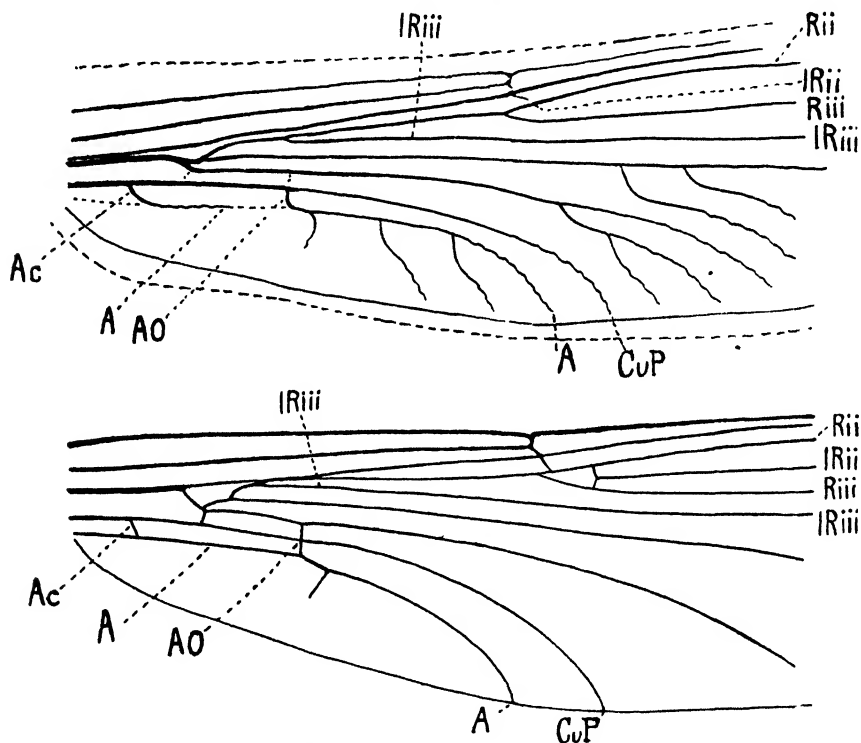


FIG. 4.—Venation and tracheation of *Agrion* sp. contrasted. Notation as for fig. 3.

distal oblique vein present connecting it to Riii which may represent the pathway of a trachea. In the former two species, however, no oblique vein can be said to be constantly present.

In the genera *Eolestes*, *Chorismagrion* and *Heteragrion* a considerable lengthening of IRiii is seen, the vein now overlapping Riii by at least 3 cells: in the first of these genera, an oblique vein is present at the same site as the Lestine one, and evidently represents a tracheation from Riii at that point. In *Synlestes* the vein is attached to Riv + v or Rii + iii at the subnodus: it has greatly lengthened and its formation is exactly similar to what is found throughout the COENAGRIDAE, except that an oblique vein is present (but occasionally absent) connecting it to Riii similar to the Lestid condition. With such a formation present, it might be thought that the tracheation would

be similar to that found in the COENAGRIIDAE, so that it becomes a matter for surprise to find that the tracheation resembles that of the *Lestes*. Thus although the venation has advanced to that of the COENAGRIIDAE, the tracheation still remains in the primitive Lestine condition. I can only infer that this represents a transitional condition and that until a new and more proximal tracheation takes place from the level of the subnodus the Lestine oblique vein will persist. Conversely, as a new tracheation has developed at the level of the subnodus in the COENAGRIIDAE, the distal oblique vein has become obsolete in them, which fact again goes to prove that tracheation of a vein only occurs when it has become static over a long period. It is interesting to reflect on what is going to happen in the case of the *Synlestes*. Will the vein IR_{iii} continue lengthening beyond the subnodus as in the *Lestes*? Or will it acquire a new trachea and become fixed at the subnodus as in the case of the COENAGRIIDAE? There is, of course, an alternative explanation, viz., that the vein IR_{iii} has evolved on different lines in the COENAGRIIDAE, and that instead of halting distally it has pursued a steady and uninterrupted course from the periphery of the wing until it attained to the level of the subnodus. Tracheation would

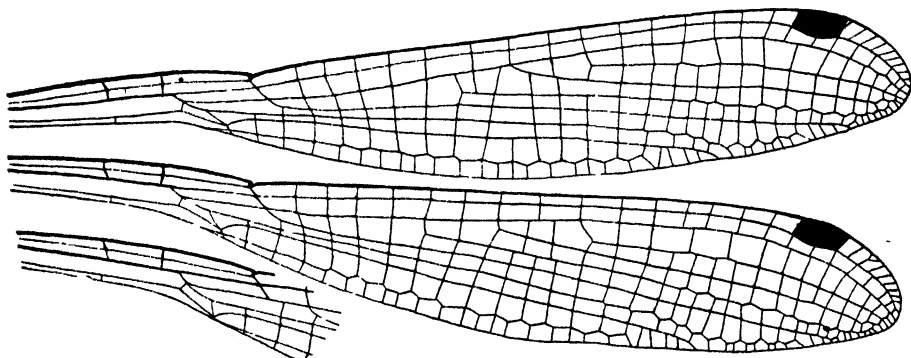


FIG. 5.—Wings of *Eolestes diotima* sp. n. (Schmidt MS.). Inset, Base of wing of *Perilestes* sp.

never occur until the vein became static at the subnodus and there would be no oblique veins marking out its course. If this latter be the correct explanation, then the LESTIDAE and COENAGRIIDAE must have pursued two widely diverging lines of evolution, the former branching off from the latter in Permian or Carboniferous times.

In the *Lestes*, IR_{iii} makes a great advance and, carrying on past the level of the subnodus, becomes attached to one of the main veins quite near to the arculus. As already stated, this attachment is yet in a very indeterminate condition, its ending being either on Riv + v or Rii + iii or absent altogether. An oblique vein passing between R_{iii} and IR_{iii} is invariably present near the centre of the wing and represents the path by which a trachea passes from R_{iii} to supply the distal end of the vein: the proximal portion is never tracheated and there is no oblique vein at the subnodus (as in the case of *Synlestes*) to suggest that the vein has halted for any time at that level.

Kennedy (1920) has advanced an interesting theory to account for the "oblique vein" in the LESTIDAE. He suggests that the position and length of IR_{iii} in the PERILESTINAE represent the archaic condition of the LESTIDAE, and that when the wing began to broaden in the course of evolution the forkings of the main veins retreated towards the base of the wing, whilst IR_{iii} lagged

behind and so was bypassed by the others. It is the inner end of this vein, as it now stands in the PERILESTINAE, which persists as an oblique vein in the LESTIDAE. Unfortunately he regards the vein IR_{iii} as an integral part of the Radial sector (Rs), viz., as the posterior branch of the forking of that sector instead of a pure intercalated vein, and so has missed the significance of his inspiration. If IR_{iii} be regarded as an intercalated vein, Kennealy's theory at once becomes more attractive, as it explains why the vein did not follow the others in their recession towards the base of the wing, because in the one case it was the origins of veins which were involved, whilst in the other it was endings. The shifting of the origins of the main veins merely involved some minor adjustments at the points from which they branched off, whereas the vein IR_{iii} would have had to undergo an actual lengthening to attain to a similar result. The main longitudinal veins are anchored to and controlled from the base of the wing: intercalaries are anchored to and controlled from the wing's periphery: it is as if, in the changing relativity of the structures of the wing, the two groups of veins were pulled in opposite directions.

The Lestine formation of IR_{iii} shows but little change in the Anisoptera but the proximal non-tracheated portion is considerably shorter. Tillyard (1922) has already shown how this shortening has been brought about by the acquisition of a new tracheation in the neighbourhood of the subnodus, as demonstrated in the family PETALURIDAE. In these archaic forms there are two oblique veins present, the original one in its Lestine position and a second more proximal one. In their larval tracheation we see a transitional stage from the Lestine to the Anisopterine: there are two tracheal twigs connecting R_{iii} with IR_{iii}, and it is evident that in the rest of the Anisoptera it is the most proximal one of these that has replaced the distal one, the latter having become obsolete from disuse.

The final stage in the evolution of the intercalary IR_{iii} is reached as a natural sequence in the higher forms of the suborder Zygoptera. In them it has extended almost right up to the arculus and after acquiring an attachment to R_{ii} + _{iii} has become tracheated from that level throughout the whole of its length. As in the case of the Coenagriodea and the Anisoptera, the acquiring of a more proximal tracheal supply has resulted in the disappearance of the oblique veins which indicated the source of previous tracheations: all suggestions of a "bridge-vein" have been lost and the vein has taken on all the characters of a main longitudinal vein, which Tillyard thought it actually to be. This perfecting of IR_{iii} in the higher forms of the Agriodea is unique and taken together with the alignment of the secondary, and the disappearance of the primary antenodals, represents the highest stage of development yet attained to in the Order Odonata.

The importance of the evidence in the phylogeny of the Order afforded by a study of the evolution of the vein IR_{iii} must be stressed. It points to a direct descent of both the higher Zygoptera and the Anisoptera from a Lestine ancestor and thus adds to the evidence that already suggests such an origin.

APPENDIX.

Eolestes gen. n. (Schmidt MSS.).

A genus of small slender Lestine dragonflies with facies rather closely resembling that of *Perilestes*. Wings somewhat broader than in this latter genus and reticulation much closer. Discoidal cell separated from the posterior border of wing by the breadth of

subdiscoidal cell, very long and narrow, very acute at distal angle, costal border about four times as long as the basal, about half the length of posterior side in fore-wing, and quite three-fifths the length of posterior side in the hind-wing: Ac at the level of the proximal antenodal, Ab nearly obsolete, the Anal vein fusing with the posterior border of wing just beyond the middle of the discoidal cell: CuP curving strongly forwards immediately after leaving apex of discoidal cell: arculus well distal of the distal antenodal: Riv + v arising at the subnodus, IRiii attached to Rii + iii at the level of the 6th postnodal, Riii arising 2 cells distal to this and IRii 2 cells beyond Riii. Pterostigma short and stout, egg-shaped but with inner and outer ends very slightly oblique, covering 2 cells: 15 to 16 postnodals. Nearly the whole of the cells in the wing quadrate: the wings markedly falcate at apex and closely resembling those of the PLATYSTICTIDAE in this respect. Petiole very long and slender as in genus *Perilestes*.

Genotype: *Eolestes diotima* Schmidt MSS.

***Eolestes diotima* sp. n. (Schmidt MSS.).**

Habitat: W. AFRICA: Cameroons. Details as for the genus. The genus appears to stand midway between *Perilestes* and *Chorismagrion*, differing from the former by the more proximal ending of the veins Riv + v and IRiii and by the discoidal cell not resting on the posterior border of the wing: from *Chorismagrion* it differs by having the discoidal cell of the fore-wings closed (the base of this cell missing in *Chorismagrion*) and by its longer and narrower wings. The position of the veins Riv + v and IRiii are similar to those of this latter genus. As is usual in archaic genera, these three are widely scattered, *Perilestes* coming from S. America, *Chorismagrion* from Australia and *Eolestes* from Africa: they must be regarded as surviving remnants of a once widely distributed fauna.

Type material presumed to be in the possession of Dr. Schmidt: see page 60.

SUMMARY.

In this paper it is shown that the longitudinal veins of the wing fall into two categories: (1) the primary main veins which arise from the base of the wing and are tracheated directly from the central system, and (2) the intercalated veins which arise from the periphery of the wing and extend inwards to become secondarily tracheated by branches given off from the primaries. The sites of these tracheations are indicated by "oblique cross veins" which tend to persist as vestigial structures in the venation. The evolution of the intercalary IRiii is traced from near its genesis as a short non-tracheated vein in the archaic PERILESTINAE to its final consummation as a fully tracheated vein in the higher forms of the Agrioidea, in which it takes on all the characters of a main basal longitudinal vein. Intercalaries are shown to develop in sections, each of which is limited proximally by an oblique cross vein and each of which is tracheated in turn, a proximal tracheation replacing the one immediately preceding it. Transitional forms are found in which two tracheae and two oblique veins, the new alongside the old, persist. Finally a short description of a new genus is given in an appendix to the paper.

The Tillyardian notation is used throughout this paper.

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BOOK NOTICE.

The genus *Conotrachelus* Dejean (Coleoptera, CURCULIONIDAE) in the North Central United States. By H. F. SCHOOF (*Illinois biol. Monogr.* **19** (3)). 1942. pp. 1-170, illust.

This work was primarily written as a thesis for the degree of doctor in the University of Illinois, but it has since been revised and augmented.

The genus *Conotrachelus* embraces 930 known species, the majority of which occur in South and Central America, and a few in the United States and Canada.

The work aims to produce workable keys and descriptions of the species from Illinois, Wisconsin, Iowa, Missouri, Kentucky and Indiana; to study the morphology of the male genitalia and determine the taxonomic significance; and finally to evaluate the morphological characters previously used in the classification of the genus, and, if possible, indicate additional characters.

The present classification arranges the species dealt with in four groups, and six new species are described, of which one occurs outside the area. A list of literature is given, and 109 figures of genitalia are shown on 9 plates.

BOOK NOTICE.

A preliminary revision of *Hesperia*. By A. W. LINDSEY. (*Denison Univ. Bull.* 42 (= *J. sci. Labs. Denison Univ.* 37) 1942.)

In 1919 a paper on the Hesperioidea of America north of Mexico appeared, and this was revised in 1930 and brought up to date.

So far, however, a satisfactory classification of *Hesperia* has not been published, and it was to fill the need of this that the author started the work which has produced the present preliminary paper.

The outbreak of war is largely responsible for the lack of finality, but the lack of means to produce the requisite coloured illustrations is also regretted by the author.

After a full description of the genus, a key which extends to 74 couplets is given, followed by a full description of the 28 included species.

The illustrations show the genitalia of each species, and a photograph of the upper and under sides is also given.

ON A NEW SPECIES OF *APIOMORPHUS* WAGNER (COL.,
CURCULIONIDAE, APIONINAE) AND A KEY TO THE KNOWN
SPECIES

By J. BALFOUR-BROWNE, M.A., F.Z.S., F.R.E.S.

(Dept. of Entomology, British Museum (Natural History).)

***Apiomorphus marshalli* sp. n.**

♂♀. Derm black, elytra faintly bluish-metallic; elongate-oval, highly convex transversely; pronotal granules distinctly lenticular; all femora distinctly armed with a short spine or spines beneath near the apex; anterior tibiae distinctly serrate along the ventral edge, internally at the apex distinctly acutely produced; pronotum and elytra clothed with a very fine recumbent pubescence of moderately short golden hairs which are very hard to distinguish.

Head about as long as wide, the eyes small and prominently rounded; frons as wide as the base of the rostrum, finely but distinctly longitudinally rugose; vertex obscurely punctate-granulate and microreticulate; temples and genae transversely finely rugose. *Rostrum* a little longer than the pronotum, not longer in the female than in the male, distinctly curved, weakly flattened and expanded at the apex, from the base to the antennal insertion slightly conically narrowed, throughout smooth, strongly shining, finely and not very closely punctured at the sides, the mid-dorsal line quite impunctate; ventrally impunctate, shining; mandibles equal in size; scrobes very short, not reaching the ventral surface. *Antennae* inserted at one-quarter of the length of the rostrum from the base, elongate, slender, the scape long, as long as the two basal segments of the funicle taken together, these segments subequal in length but the basal segment twice as wide as the second segment and two to two and a half times as long as wide; third segment half the length of the second, fourth to seventh progressively shorter, seventh square; club elongate fusiform, loosely aggregated, the three segments subequal. *Pronotum* barely longer than wide, widest at the middle, the sides strongly rounded, the anterior margin slightly narrower than the base, the base straight, the posterior angles rectangular; surface coarsely granulose, the granules lenticular and slightly obliquely directed; the entire length of the middle of the dorsum with a smooth groove in which, just in front of the scutellum, is a very obsolete foveole; dorsal outline strongly longitudinally convex, highest at middle. *Scutellum* small, semicircular. *Elytra* about twice as long as wide, widest about two-thirds of the length from the base, the sides divergent straight from the shoulder to the widest point, then slightly attenuate to the abruptly rounded apex; strongly catenate-punctate-striate, the punctures of the striae deep and separated from the neighbouring punctures by a space about equal to their diameter; the interstriae barely wider than the striae, slightly convex, shining, with a single row of fine recumbent golden hairs, barely visible except when seen at an oblique angle; dorsal outline weakly regularly convex longitudinally; humeral callus not very prominent; the outermost (apparent marginal) stria dividing basally into the normal ninth and short tenth (true marginal) striae, and again apically; the first stria uniting with the tenth, the second with the ninth at the apex. *Venter* impunctate, metasternum smooth and shining, abdomen dull, finely rugose and reticulate except the fifth ventrite which is polished and shining in both sexes. *Legs* moderately long and slender, the hind femora not attaining the apex of the elytra; all femora finely toothed near the apex beneath; the interior tibiae dentate or serrate along the ventral face, the apex acutely pro-

duced internally; middle and hind tibiae simple; basal segment of the tarsi long, about as long as the second and third segments taken together, slender; fifth segment short, barely exceeding the lobes of the third segment; claws short, strongly curved, bluntly toothed at the base beneath. *Sexual dimorphism* only evident in the fifth ventrite which is transverse in the male, semicircular in the female and with a small median emargination in the middle of the posterior edge in the latter sex.

Length: 3.14–3.2 mm. (*sine rostro*).

Holotype ♂, SOUTH AFRICA: Cape Province; Otterford, xii. 1927, "Feeding on the leaves of *Podocarpus thunbergii*" (Ac.P. 4009. Serial No. 1748) (submitted by Division of Entomology, Pretoria).

Allotype ♀, same particulars.

Paratypes, 1 ♂, 2 ♀♀, same particulars. 1 ♂, SOUTH AFRICA: Cape Province; Swellendam, 9–14.xii.1931 (*R. E. Turner* leg.).

The types and one male paratype in the British Museum (N.H.); one male and two female paratypes will be deposited in the Division of Entomology, Pretoria.

This new species must belong to *Apiomorphus* (s.str.) by the presence of the denticulations near the apex of the femora beneath, but the character of the pubescence and the distinctly denticulate anterior tibiae will readily separate it from *cyaneus* Wagn. Voss (1931, *Mitt. deuls. ent. Ges.*, Jahrg. 2: 2) created a subgenus, *Apiomorphilus*, for two species—*inermipes* Voss (Transvaal) and *corvinus* Voss (Abyssinia)—which lack the denticulations of the femora and which he described as having the elytra not pubescent. Examination has shown, however, that the elytra of both species possess a distinct recumbent pubescence of the same type as that described for *marshalli* sp. n. and accordingly the only remaining subgeneric character is that of the presence or absence of the femoral teeth. I have named the new species after Sir Guy Marshall, who had previously recognised it to be distinct from the three described species.

Voss's key for the determination of the known species of the genus is here amended and extended to include the new species:—

1. Femora denticulate near apex beneath *Apiomorphus* (s.str.). 2.
- 1'. Femora not denticulate near the apex beneath. . . . *Apiomorphilus* Voss. 3.
2. Femoral teeth distinct; thoracic granules round; pronotum without median dorsal furrow; elytra with erect straight black hairs; anterior tibiae unarmed internally. Metallic micant. *cyaneus* Wagn.
- 2'. Femoral teeth less distinct; thoracic granules lenticular; pronotum with median dorsal furrow; elytra with adpressed, weakly curved fine golden hairs; anterior tibiae serrate-dentate internally. Deep black. *marshalli* sp. n.
3. Frons almost as wide as the base of the rostrum; anterior tibiae unarmed internally; elytral interstriae as wide as the striae, matt, transversely striolate; size larger *inermipes* Voss.
- 3'. Frons only half as wide as the base of the rostrum; anterior tibiae internally serrate-dentate; elytral interstriae slightly narrower than the striae, sub-nitid; size smaller *corvinus* Voss.

SETAPION GEN. N., WITH DESCRIPTIONS OF TWO NEW SPECIES (COL., CURCULIONIDAE)

By J. BALFOUR-BROWNE, M.A., F.Z.S., F.R.E.S.

(Dept. of Entomology, British Museum (Natural History).)

Setapion gen. n. Apioninarum.

Submentum pedunculate. Mandibles very short. Head largely developed behind the eyes. Rostrum long, cylindrical, straight; scrobes foveiform, sharply incised, directed postero-ventrally and uniting to form a shallow fovea between the eyes. Antennae straight, scape variable, funicle 7-segmented, club normal. Eyes lateral. Pronotum without ocular lobes. Scutellum very small, punctiform. Elytra closely covering the sides of the body, 9-striate-punctate; scales erect, flattened, setiform. Anterior coxae conical, cylindrical, their foramina partially separated by an intercoxal lamina. Middle coxae comparatively widely separated by mesosternal and metasternal processes which meet. Legs very short; femora inflated but unarmed; tarsi 5-segmented, the third strongly bilobate, the lobes narrow, the fourth very small; claws free, strongly curved and distinctly dentate at the base beneath.

Genotype: *Setapion quantillum* sp. n.

Setapion quantillum sp. n.

♂♀. Derm black; head wide, *Apiomorphus*-like; scrobes sharply impressed and directed postero-ventrally, fusing beneath; form elongate-parallel; pronotum distinctly longer than wide; legs very short, hind femora not attaining the apex of the second ventrite; clothing of peculiar flattened, erect, lanceolate setiform scales, scattered on the pronotum, borne linearly on the elytral interstriae as follows, on the sutural, 2nd, 4th, 6th, 8th, and marginal; claws strong, strongly curved and distinctly dentate at the base beneath; four anterior tibiae of the male with a short, stout, termino-ventral spur.

Head wider than long, eyes moderately prominent, weakly rounded; frons wide, as wide as the base of the rostrum, finely but distinctly rugose-punctate, with two more prominent punctures at the extreme base of the rostrum whence arise two long divergent, flattened lanceolate setose scales, a second pair of similar but not divergent scales arise at the extreme posterior edge of the frons near the eyes; vertex finely rugose-punctate; venter strongly rugose-punctate, posteriorly finely transversely strigulose. *Rostrum* almost straight, cylindrical, shorter than the pronotum, very closely, finely and evenly punctured, the interstices much less than the diameter of the punctures, extreme apex subnitid. *Antennae* short, moderately stout, the scape almost as long as the first six segments of the funicle taken together; the basal funicular segment as long as the second, third and fourth segments taken together; second to seventh segments subequal, transverse; club short, ovoid. *Pronotum* distinctly longer than wide, widest at middle, base straight, sub-basal constriction shallow, subapical constriction strong, anterior margin simple; surface densely and finely punctulate, the interstices evidently less than the diameter of the punctures; dorsal outline sinuate, the sub-apical constriction extending across the dorsum; medio-dorsal sub-basal fovea obsolete; sparsely clothed with erect, long, flattened, lanceolate setose scales; prosternum exceptionally short in front of the procoxae, these latter almost separated by anterior and posterior processes which bridge almost two-thirds of the space, but do

not meet. *Scutellum* minute, punctiform. *Elytra* elongate, parallel-sided for two-thirds from the base from the strong humeral callus, thence to the apex rounded attenuate; strongly 9-punctate-striate, the first to fifth attaining quite to the base; the punctures large and strongly impressed, separated from each other by about one-quarter the diameter of the punctures; interstriae narrow, not wider than the serial punctures, flat basally, weakly convex apically; the sutural, second, fourth, sixth, eighth and marginal interstriae bearing a sparse unilinear series of long, erect, flattened, lanceolate brown setose-scales, the first interstria with a similar single setose-scale a short distance behind the base; dorsal outline flattened to two-thirds from the base, the posterior declivity gradually steeper. *Legs* very short, the femora, particularly the anterior pair, rather inflated at middle, tibiae straight, the four anterior tibiae of the male with a short, stout termino-ventral spur; tarsi with the second segment short, only one-half as long as the basal segment, third strongly bilobate, the lobes rather narrow; legs, including two basal tarsal segments, clothed with similar setose-scales to the dorsum; claws long, very strongly curved and strongly dentate at the base beneath, the tooth moderately acute. *Venter* shining, the metasternum at sides, fused first and second ventrites throughout strongly, deeply, but not closely punctured, the punctures setiferous; third, fourth and fifth ventrites finely micro-rugulose. *Sexual dimorphism* evident in the more transverse fifth ventrite of the male and the short termino-ventral spur of the four anterior tibiae of the male.

Length : 1.49-1.56 mm. (*sine rostro*).

Holotype ♂, SOUTH AFRICA : Cape Province; Swellendam, 17.xii.31-18.i.32 (*R. E. Turner* leg.).

Allotype ♀, same particulars.

Paratypes, 20 specimens, same particulars. 2 specimens, same locality, xi.1933.

The type and paratypes in the British Museum (N.H.).

This little species is unlike any other described species known to me by the distinctly partially separated procoxae, the comparatively widely separated mesocoxae and the exceptional character of the scales (although somewhat similar in that feature to the widely different *Apion erinaceum* Wagn.). The facies is also very unlike *Apion* and I feel compelled to separate the insect generically from *Apion* Herbst in spite of the slenderness of the characters on which it is founded. This procedure, as has already been remarked by Riley (1883, *Bull. Brooklyn ent. Soc.* 6 : 61), can only be justified by the uniformity of the APIONINAE in structural characters in relation to the very large number of species in the group. Such genera may be accepted as genera of "convenience" by which a simplification of the task of identification in a large and uniform group of upwards of 1400 named species may be obtained, and they also simplify the placing of a given species in relation to other species within the group.

***Setapion provinciale* sp. n.**

♂♀. Derm deeply blackish-rufescent, legs reddish; head wide, conical, widest at base, eyes not very prominent but distinctly more so in the male than in the female; scrobes distinct, directed postero-ventrally; form elongate-parallel; pronotum little longer than wide, widest about the middle; scutellum minute; legs very short, femora strongly inflated; clothing of scales similar in character to those of *quantillum* sp. n. but narrower, and, additionally, on the pronotum and on the elytral humeri with short, sparse, fine white hairs; claws long, sharply curved and strongly dentate at the base beneath.

Head conical, about as long as wide at the base, eyes in the male not very prominent, in the female not at all prominent; frons as wide as the base of the rostrum, longitudinally

rugose-punctate with a short median striae, posteriorly closely finely punctured, vertex strigulose; at the base of the rostrum two anteriorly directed, erect long flattened lanceolate setose scales; venter smooth, impunctate, posteriorly transversely strigulose. *Rostrum* of the male as long as the head and pronotum together, of the female, one and one-half times as long as the head and pronotum together, slender, parallel, quite straight, closely, finely and evenly punctulate; at the base with one pair of larger punctures anterior and external to the extreme basal pair carrying similar but slightly shorter flattened setose scales and a further pair of similar larger punctures still more antero-external to these with similar but longer flattened setose-scales. *Antennae* long and slender, the scape very long, as long as the first four segments of the funicle taken together, the basal funicular segment of equal length to, but twice as wide as, the second segment, the third and fourth segments subequal but slightly shorter than the first and second segments, fifth to seventh segments progressively shorter and broader, seventh as wide as long; club short ovoid. *Pronotum* little longer than wide, widest at middle, base straight, sides weakly but distinctly rounded, sub-apical constriction shallow but distinct, sub-basal constriction quite obsolete; anterior margin simple; surface closely punctured, the punctures of two sizes, the larger, bearing long, flattened, erect, lanceolate setose scales, and the smaller, less than half the diameter of the larger, bearing recumbent short fine white hairs; without trace of the medio-dorsal sub-basal foveole; the anterior margin medially with the erect setose scales, laterally with white hairs. *Scutellum* minute, punctiform. *Elytra* elongate-oval, parallel-sided to two-thirds from the base, the humeral callus very strong, the base straight; dorsal outline almost flat to two-thirds of the length, thence abruptly convex to the almost vertical posterior declivity; distinctly 9-punctate-striate, the striae punctures moderately deep and almost square, the interstices about as long as the punctures; interstriae weakly convex, not wider than the striae, each with a unilinear series of long, erect, flattened, lanceolate setose scales, particularly long at the shoulder on the marginal interstria; second interstria at extreme base with a small tubercle. *Legs* very short, the femora strongly inflated at middle, hind femora not exceeding the fourth ventrite; tibiae straight, slightly sinuate before the apex ventrally, the legs, including the two basal tarsal segments, clothed with the typical setose scales; of the male with the four anterior tibiae produced into a short stout spur termino-ventrally; tarsi slender, the third segment deeply and slenderly bilobate; claws very strong, abruptly curved and strongly dentate at the base beneath. *Venter* shining, the metasternum at the sides, the first and second ventrites laterally and the fifth ventrite coarsely punctured, the punctures setiferous; common suture of the fused first and second ventrites laterally deeply impressed. *Sexual dimorphism* noticeable in comparative length of the rostrum, more transverse fifth ventrite and presence of termino-ventral spur of the four anterior tibiae of the male, also by the slightly more prominent eyes of the male.

Length : 2.11-2.30 mm. (*sine rostro*).

Holotype ♂, SOUTH AFRICA : Cape Province; Swellendam, xi.1933 (*R. E. Turner* leg.).

Allotype ♀, same particulars.

The type and allotype are in the British Museum (N.H.).

This species, at first sight strongly suggestive of an *Apimorphus*, is clearly very closely related to *quantillum* sp. n., but it is larger, the rostrum much longer and distinctly sexually dimorphic and the femora proportionally more inflated than in that species.

NEW OR LITTLE-KNOWN SPECIES OF EXOTIC TIPULIDAE (DIPTERA) II

By Professor Charles P. ALEXANDER, F.R.E.S.

(Massachusetts State College, Amherst, Massachusetts.)

THE preceding part under this general title was published in 1943, *Proc. R. ent. Soc. Lond.* (B) 12 : 173-180. Most of the species discussed herewith are from the Netherlands East Indies and were included in collections sent to me for identification by Dr. M. A. Lieftinck. When conditions permit, the types of such novelties will be returned to Dr. Lieftinck for incorporation in the collection of one of the leading museums in Holland. The location of the other specimens will be discussed in conjunction with the forms in question.

***Tipula (Acutipula) lieftinckiana* sp. n.**

Size large (wing, male, 20 mm.); general coloration dark brown, heavily pruinose; wings with a strong brownish tinge, veins *Cu* and *m-cu* seamed with darker; conspicuous pale obliterative areas before cord and beyond the stigma; no dark spot in cell *M*; abdomen black; male hypopygium with median appendage of ninth tergite bilobed at apex; outer dististyle broadest just beyond base; inner dististyle bearing two pairs of conspicuous black spines, its beak slender; eighth sternite with each outer lateral angle bearing a small pale lobe tufted with long setae.

Male. Length about 18 mm.; wing 20 mm.; antenna about 3 mm.

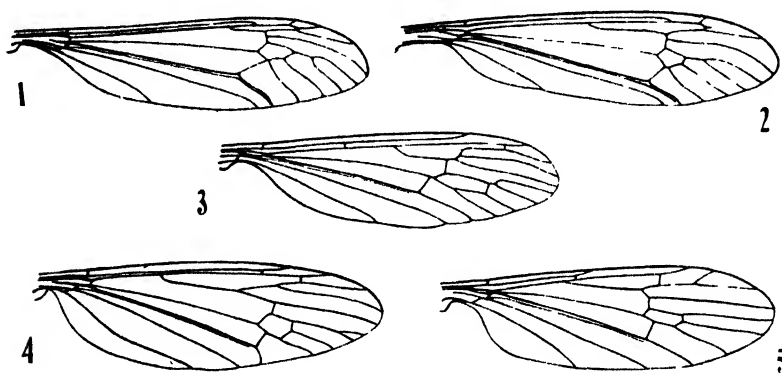
Frontal prolongation of head relatively long, brown above, more reddish-brown beneath; nasus elongate, black; palpi black, the basal segment paler. Antennae relatively short; scape pale brown, pedicel light yellow; flagellar segments weakly bicoloured, dark brown basally, the outer portion obscure yellow; outer segments uniformly darkened; basal enlargements of segments only feebly developed; verticils exceeding the segments; terminal-segment elongate-conical, about one-half the length of the penultimate. Head dark brown; vertical tubercle relatively low and inconspicuous; anterior vertex relatively wide, about three times the average diameter of the scape.

Pronotum dark brown, variegated with paler. Mesonotum chiefly dark brown, heavily pruinose, the coloration largely destroyed by water; apparently the ground colour is light grey, with darker brownish-grey stripes; posterior sclerites of notum dark brown, more or less pruinose, the scutellum and postnotum more uniformly dark; parascutella and lateral portions of scutellum somewhat paler; pleurotergite darkened. Pleura with the propleura and dorsopleural membrane pale, the mesepisternum darkened, the meral region again pale. Halteres dark brown. Legs with coxae dark brown, somewhat paler apically; femora reddish-brown, the tips brownish-black; tibiae reddish-brown, the tips somewhat more narrowly blackened; tarsi reddish-brown, passing into brownish-black. Wings (fig. 1) with a strong brownish tinge, the prearcular and costal fields somewhat more yellowish-brown; stigma long and narrow, darker brown; a restricted poststigmatal whitened area, involving cell *Sc*₂ and adjoining portions of *R*₂; a much more extensive obliterative area extending from before stigma basad of cord, extending into proximal portion of cell *M*₃, crossing the basal third of cell 1st *M*₂; broad and conspicuous brown seams along *m-cu* and distal section of vein *Cu* and less distinctly along the basal half of the main stem of *Cu* but with no darkening in cell *M*; veins dark brown, more yellowish-brown in the brightened

PROC. R. ENT. SOC. LOND. (B) 13. PTS. 7-8. (AUGUST 1944.)

basal and costal portions. Venation: *Rs* shorter than *m-cu*; cell 1st *M*₂ of moderate size, its inner end only moderately pointed.

Abdomen with basal half of second tergite reddish-brown, the posterior half and broad lateral portions of the basal half brownish-black; succeeding tergites and all but the basal sternites uniformly blackened. Male hypopygium (figs. 6, 7) with the median lobe of tergite, 9t, relatively broad, depressed, at apex with two short lobes that are separated by a slightly narrower U-shaped notch that is fringed with delicate setulae; each lobe with abundant blackened spines to produce a macelike appearance; the surface and margin of the lobe back from apex with a few scattered spines and numerous long setae. Outer dististyle, *od*, broadest just beyond base, thence gradually narrowed outwardly, the setae chiefly marginal in distribution. Inner dististyle, *id*, with the lower beak slender; outer lobe with two powerful black spines; in axil between outer lobe and lower beak with a smaller lobe that terminates in two even longer black spines. Ventromesal portion of ninth sternite, on either side of midline, with a conspicuous brush of reddish setae that are directed



FIGS. 1-5.—1, *Tipula (Acutipula) lieftinckiana* sp. n.; venation. 2, *Tipula (Oreomyza) hoogerwerfi* sp. n.; venation. 3, *Nipponomyia nigrocorporis* sp. n.; venation. 4, *Hexatoma (Eriocera) celebesiana* sp. n.; venation. 5, *Erioptera (Empeda) baluchistanica* sp. n.; venation.

ventrad. Eighth sternite, 8s, sheathing, its caudal border broadly truncated, with pale membrane set with numerous setae and delicate marginal setulae; each lateral angle produced into a small pale lobe bearing a brush of much longer setae.

Holotype, ♂, Mount Leuser (Loser), east summit; Atjeh, North Sumatra; altitude 3300–3500 metres; February 1937 (*A. Hoogerwerf*).

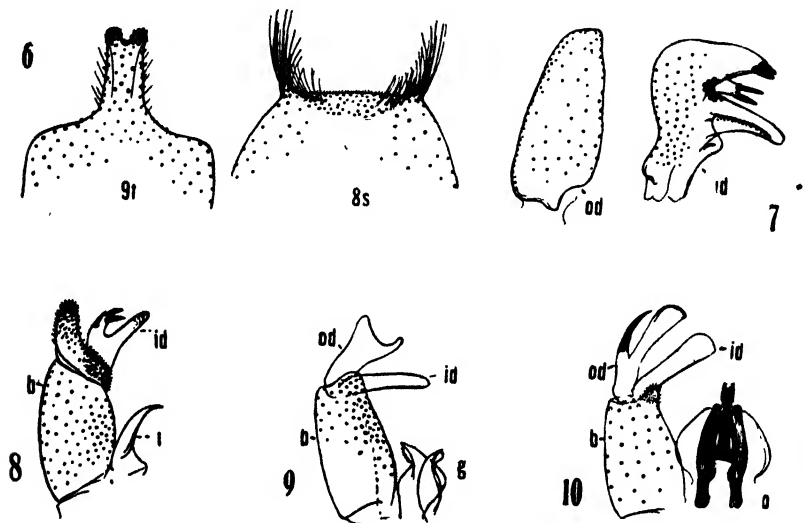
I am pleased to name this interesting fly in honour of Dr. M. A. Lieftinck, to whom I am greatly indebted for many past favours. The species is quite distinct from the other species that have been described from the Indomalayan region. These various species or subspecies include *Tipula (Acutipula) de meijerei* Edwards, *T. (A.) jacobsoni* Edwards, *T. (A.) pseudofulvipennis* de Meijere, and *T. (A.) umbrinoides* Alexander. It should be noted that these species have been placed in the synonymy of *T. (A.) quadrinotata* Brunetti, but I am very dubious of such a procedure. We now know that there are many valid species of the genus in Asia and I believe that a critical study of the structure of the male hypopygium must be made before any synonymy can be asserted. It is certain that as regards *umbrinoides* I can see little similarity between this species and *quadrinotata*, of which I have an abundance of material;

all details of venation, as length of *Rs*, shape of upper radial cells, conformation of cell 1st *M*₂, and other features, being entirely different in the two flies.

***Tipula (Oreomyza) hoogerwerfl* sp. n.**

General coloration dark brown, the praescutum with three slightly darker brown stripes that are scarcely differentiated from the ground; antennae bicoloured; wings whitish, handsomely patterned with dark and lighter brown; tip of vein *R*₁₊₂ atrophied; *Rs* unusually long, exceeding three times *m-cu*; abdominal tergites reddish, grey pruinose; sternites reddish, trivittate with dark brown; cerci long and slender, their margins smooth.

Female. Length about 23 mm.; wing 19 mm.; antenna about 3 mm.



FIGS. 6-10.—6, 7, *Acutipula (Acutipula) lieftinckiana* sp. n.; details of male hypopygium. 8, *Nipponomyia nigrocorporeis* sp. n.; male hypopygium. 9, *Erioptera (Podoneura) peregrinator* sp. n.; male hypopygium. 10, *Erioptera (Empeda) baluchistanica* sp. n.; male hypopygium.

(Symbols: *b*, basistyle; *g*, gonapophysis; *i*, interbase; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *s*, sternite; *t*, tergite.)

Frontal prolongation of head relatively short, brown dorsally, more blackened on sides; nasus distinct; palpi black, the incisures narrowly more reddened; terminal segment broken. Antennae with scape and pedicel yellow; basal two flagellar segments yellow, the succeeding segments bicoloured, their bases infuscated, becoming darker to almost black on the outer segments; basal enlargements only weakly developed; longest verticils a trifle exceeding the segments. Head black, sparsely pruinose, to appear blackish-grey; anterior vertex about twice as wide as the diameter of scape.

Pronotum brown. Mesonotum chiefly dark brown, the praescutum of the unique type badly bent; ground colour brown, with a sparse yellow pollen or weak pruinosity that obscures the ground; three darker brown entire praescutal stripes, the median one vaguely divided by a central vitta; praescutal interspaces with black setigerous punctures that are more or less confluent. Pleura and pleurotergite chiefly dark brown. Halteres with stem yellow, knob weakly darkened. Legs with the coxae and trochanters reddish-brown, sparsely pruinose; remainder of legs broken. Wings (fig. 2) with the ground colour whitish,

handsomely patterned with dark and lighter brown; the major dark areas lie at arculus, origin of R_s , fork of R_s , and at stigma, the latter two confluent; major paler brown areas in outer radial field, chiefly in cell R_3 ; before and beyond midlength of cell M ; in outer end of cell 1st A and occupying most of cell 2nd A ; most of the veins, including M , 2nd A , and all veins beyond cord with the exception of R_3 , narrowly but very conspicuously bordered by dark brown; prearcular field brownish-yellow, brighter behind; cells C and Sc light brown, the latter brightening to yellow before stigma; a continuous brown marginal seam from vein R_{4+5} to Cu ; veins yellow in the ground areas, dark brown in the infuscated portions. Macrotrichia on all veins beyond cord and for almost the whole length of M . Venation: Tip of R_{1+2} atrophied, with only the basal third persistent; R_s unusually long, exceeding three times $m-cu$; cell M_1 about three times its petiole; $m-cu$ shortly before fork of M_{3+4} ; cell 2nd A wide.

Abdominal tergites with the first blackened, more reddish on sides; succeeding tergites rich reddish-yellow, the sublateral portions dark brown, the extreme lateral margins beyond the basal rings yellowish, grey pruinose; subterminal segments narrowly dark brown; sternites reddish, conspicuously and continuously trivittate with dark brown, only the extreme caudal borders of the segments pale. Ovipositor with cerci long and slender, their margins smooth; hypovalvae very short.

Holotype, ♀, Mount Leuser (Loser), east summit; Atjeh, North Sumatra; altitude 3300–3500 metres; February 1937 (*A. Hoogerwerf*).

Tipula (*Oreomyza*) *hoogerwerfi* is dedicated to the collector of the small but interesting series of flies from Mount Leuser. Among the described regional species having heavily patterned wings, it appears to be closest to *Tipula gedehana* de Meijere, differing conspicuously in the venation, as the long R_s and atrophied R_{1+2} . I had earlier referred *gedehana* to the subgenus *Vestiplex* Bezzi but in the light of much confusion still existing as to the strict subgeneric characters of *Vestiplex* and *Oreomyza*, the assignment must be considered as being provisional.

Nipponomyia nigrocorporis sp. n.

General coloration uniform black, including the entire thorax and abdomen, the surface subnitidous; legs black; wings pale yellow, handsomely patterned with dark and paler brown, including a series of brown dots and spots along the cephalic half of cell C ; cell 1st M_2 closed; male hypopygium with three black spines on outer lobe of the inner dististyle.

Male. Length, excluding head, about 12 mm.; wing 11.5 mm.

Head broken.

Entire prothorax and mesothorax black, the surface subnitidous; praescutum with long conspicuous erect setae on interspaces. Halteres with stem obscure yellow, the knob weakly infuscated. Legs with the coxae black; trochanters dark brown; remainder of legs brownish-black. Wings (fig. 3) with the ground colour pale yellow, handsomely patterned with brown, including about six major areas in the costal field, the first at and beyond arculus, including cells Sc , R and M ; second area at Sc_2 , including cells C , Sc and R ; third area at and above origin of R_s , involving cell Sc above the origin, continued distad as a paler seam along R_s almost to its fork; fourth and fifth dark areas before and beyond the conspicuous yellow stigma, the former confluent with a somewhat paler brown seam along cord; sixth dark area including the narrow wing tip in cells R_2 to M_1 , inclusive; besides the major dark areas there are further paler washes beyond the fork of R_s , following veins R_4 and R_5 , outer end of cell 1st M_2 , and as marginal darkenings at ends of all veins beyond the apical area, largest at 2nd A ; a series of more than a score of brown spots and dots along cell C , both before and beyond the humeral cross-vein, occupying the cephalic half of cell, the posterior half clear yellow, these areas small, ill-delimited and more or less

longitudinal in position, not forming clear-cut transverse black dashes as in some allied species; before h the dots form a continuous streak, farther distad becoming more scattered and confluent; veins pale brown, somewhat darker in the patterned areas. Costal fringe relatively short but dense. Venation: $r-m$ more than one-half its length before fork of Rs ; cell 1st M_2 closed; $m-cu$ before fork of M .

Abdomen, including hypopygium, black, the more basal sternites slightly more piceous, the extreme caudal borders of tergites four and five whitened. Male hypopygium (fig. 8) with the outer dististyle or lobe of basistyle elongate, closely applied to apex of basistyle, more or less sigmoid in outline, the surface with abundant short black spines distributed throughout the length. Inner dististyle, id , bifid, the inner lobe a slender simple blade, the shorter outer lobe terminating in two conspicuous black spines, with a third smaller spine on outer margin just back from tip. Basistyle, b , with numerous long setae, those of mesal face unusually long, yellow. Interbase, i , acutely pointed at apex.

Holotype, ♂, Mount Leuser (Loser), Atjeh, North Sumatra; altitude 2000–3500 metres, 30 January, 1937 (*A. Hoogerwerf*).

Nipponomyia nigrocorporis is very different from the other described species of the genus, particularly in the uniform black coloration of the body and legs. By my key to the known species of *Nipponomyia* (1935, *Philipp. J. Sci.* 56: 551–552), the fly runs with some difficulties to *N. symphyletes* (Alexander), of Formosa, which differs conspicuously in the coloration of the body and legs. The only other species of the genus known from Sumatra is *N. sumatrana* (de Meijere), the type of which was taken in June 1917 by Edward Jacobson on Mount Talamau (Mount Ophir of Wallace and other early workers). Since the specimens were collected in June it is probable that such material was taken at or near the exact summit of Talamau (2912 metres) where Jacobson collected on 6 June, 1917. This latter fly is entirely distinct from the species herewith described as new.

Hexatomia (Eriocera) celebesiana sp. n.

Belongs to the *dichroa* group; general coloration black, abdominal segments two to six bright orange, the tergites with a narrow transverse black line immediately before apex; halteres and legs black; antennae black, the basal two flagellar segments brownish-yellow; wings conspicuously blackened; cell M_1 present; abdomen (male) flattened dorsoventrally, its greatest width about two-thirds that of wing.

Male. Length about 13 mm.; wing 11.5 mm.

Rostrum and palpi black. Antennae 7-segmented; scape and pedicel brownish-black; basal two flagellar segments brownish-yellow, the outer ones black; flagellar segments long-cylindrical, with conspicuous black setae. Head blackish-grey; vertical tubercle poorly developed.

Thorax almost uniformly blackened, the surface very sparsely pruinose; mesonotum with relatively abundant, coarse, black setae. Halteres black, the extreme base of stem brighter. Legs black throughout. Wings (fig. 4) conspicuously blackened, the basal and costal portions somewhat more intense; a pale streak in basal half of cell 1st A adjoining the vein; veins dark brown. Macrotrichia of veins beyond cord abundant and conspicuous, especially in outer radial field, becoming more sparse on medial veins, on M_4 restricted to two or three trichia at extreme outer end. Venation: Sc long, Sc_1 ending beyond mid-length of vein R_{2+3} ; R_{1+2} and R_{2+3+4} subequal in length, both longer than R_{2+3} ; cell M_1 present but relatively small and weak, about two-thirds its petiole; cell 1st M_2 short-rectangular; $m-cu$ about two-thirds its own length beyond the fork of M .

Basal abdominal segment dark brown; tergites two to six, and the lateral portions of seven, bright orange with a narrow transverse black line just before apex of tergites two to

six, inclusive; terminal segments, including the small hypopygium, black; sternites coloured like the tergites but with the blackened lines lacking; abdomen conspicuously flattened dorso-ventrally, its greatest width about two-thirds that of the wing.

Holotype, ♂, Lonrong Wasampone, south-western Celebes, altitude 150 metres, June 1936 (*L. J. Toxopeus*); returned to Dr. Lieftinck.

Hexatoma (Eriocera) celebesiana is most similar to species such as the Chinese *H. (E.) abdominalis* (Alexander) and *H. (E.) platysoma* Alexander, where the abdomen of the male sex is similarly very wide and conspicuous. Both of these species have cell M_1 of the wings lacking. The Philippine *H. (E.) lativentris* (Bezzi) has the abdomen somewhat similarly dilated but is an entirely distinct species. By Edwards' key to the Old World species of the subgenus (1921, *Ann. Mag. nat. Hist.* (9) 8 : 70-78), the present fly runs to *H. (E.) xanthopyga* (de Meijere), which is again entirely different, with the abdomen of the male of normal form.

Erioptera (Podoneura) peregrinator sp. n.

General coloration of mesonotum buffy to grey, the praescutum with three approximated brown stripes, the lateral pair interrupted by the long black pseudosutural foveae; legs uniformly brownish-black; wings brownish-yellow, abundantly dotted with pale brown; male hypopygium with the outer dististyle broadly expanded outwardly, entirely glabrous; inner style a relatively slender, flattened blade.

Male. Length about 5 mm.; wing 5.5 mm.

Rostrum and palpi brown. Antennae relatively short, dark brown throughout; flagellar segments suboval to subcylindrical. Head grey; anterior vertex more than twice the diameter of scape.

Pronotum buffy on sides, dark brown above. Mesonotal praescutum brownish-buff, with three approximated brown stripes, the lateral pair interrupted by the long conspicuous black pseudosutural foveae; scutum grey, the lobes vaguely patterned with brown; scutellum brownish-grey, with a dark brown median dash; postnotum brownish-grey, vaguely patterned with brown. Pleura brownish-grey, including the dorsopleural membrane. Halteres infuscated. Legs with the coxae brownish-grey; trochanters brown; remainder of legs uniformly brownish-black. Wings with the ground colour brownish-yellow, abundantly dotted with pale brown, the basal portions almost as far as the general level of origin of R_s , cells C and Sc , and the vicinity of the cord more nearly free from pattern; extreme wing tip and cell $2nd\ A_2$ also nearly unpatterned; elsewhere the dots are very abundant and more or less confluent; veins brown, paler in the more brightened areas. Macrotrichia of veins beyond cord almost lacking except on R_{1+2} and tip of R_6 . Venation: Sc_1 ending opposite R_2 , Sc_2 almost exactly opposite midlength of R_s ; R_{2+3} and R_2 subequal; $m-cu$ oblique, more than one-third its length before the fork of M ; the *Podoneura* cell ($2nd\ A_2$) moderately sprawly.

Abdominal tergites dark brown, sparsely pruinose, the median area more reddish-brown; sternites more greyish, with a brown median vitta, the extreme caudal borders of the segments more brightened; hypopygium dark. Male hypopygium (fig. 9) with the outer dististyle, *od*, broadly expanded outwardly, entirely glabrous; inner angle produced into a narrow arm, the tip obtuse. Inner dististyle, *id*, a long, relatively slender, flattened blade, the tip obtuse. Basistyle, *b*, with numerous long setae near apex and along mesal face but these sparse or lacking on basal portion of outer face. Gonapophyses, *g*, flattened, the larger outer blade terminating in a flange that bears a few obtuse teeth or crenulations.

Holotype, ♂, Central Asiatic U.S.S.R.; label (in Russian) translated reads: "Second mill, Mendeynk, Snegirev, 20 April, 1926"; Alexander Collection.

Received in exchange with Lackschewitz, who also distributed specimens to the British Museum (Natural History), through Edwards.

All other known species of the subgenus *Podoneura* Bergroth are African (Alexander, 1930, The African Republic of Liberia and the Belgian Congo, *Rept. Harvard African Expedition 1926-1927*, 2: 1017-1018). The present fly is readily distinguished by the abundantly dotted wings and, especially, the structure of the male hypopygium.

Erioptera (*Empeda*) *baluchistanica* sp. n.

General coloration dark grey; halteres yellow; femora brown, a trifle brightened at base; tibiae and basitarsi yellow, the tips narrowly infuscated; wings greyish-yellow, the veins yellowish-brown, relatively inconspicuous; *Sc* short; vein R_3 unusually short and oblique; cell 1st M_2 closed; *m-cu* more than one-half its length beyond the fork of M ; male hypopygium with the outer dististyle bifid, the outer arm a blackened rod that narrows to an acute spinous point; phallosome relatively large and conspicuous.

Male. Length about 3.5 mm.; wing 3.5 mm.

Rostrum dark brown, grey pruinose; palpi dark brown. Antennae brownish-black, relatively short; flagellar segments oval. Head grey; anterior vertex relatively wide, at narrowest point nearly three times the diameter of scape.

Pronotum and mesonotum almost uniformly dark grey, the pretergites a little more brownish-yellow; pseudosutural foveae and tuberculate pits black. Pleura dark grey; dorsopleural membrane brown. Halteres clear light yellow, especially the knobs. Legs with the coxae grey pruinose; trochanters obscure yellow; femora brown, a trifle brightened at base; tibiae and basitarsi yellow, the tips narrowly infuscated; remainder of tarsi passing into black. Wings (fig. 5) greyish-yellow, the stigmal region not or scarcely darker; prearcular and costal fields clearer yellow; veins pale yellowish-brown, relatively inconspicuous against the ground. Costal fringe short but dense; veins beyond cord almost glabrous; distal section of R_1 with numerous trichia over virtually the whole length. Venation: *Sc* short, Sc_1 ending about opposite one-third the length of R_3 , Sc_2 slightly removed from its tip, at near mid-distance between origin of R_3 and tip of Sc_1 ; R_{2+3+4} subequal to R_2 ; R_3 unusually short and oblique, cell R_3 thus being more like *Gonempeda*; distance on wing margin between veins R_{1+2} and R_3 about equal to the latter vein; cell 1st M_2 closed, about one-half as long as vein M_3 beyond it; *m-cu* at near one-third the length of cell, or more than one-half its own length beyond fork of M ; Anal veins divergent.

Abdomen, including hypopygium, dark brownish-black, sparsely pruinose. Male hypopygium (fig. 10) with the outer dististyle, *od*, bifid, its outer arm a little shorter, appearing as a slender rod that narrows to an acute spinous point; inner arm expanded outwardly, the apex short-cultriform. Inner dististyle, *id*, a simple brownish-yellow flattened blade that has somewhat the same outline as the inner arm of the outer style; surface, especially the ventral edge, with a few microscopic setulae. Phallosome, *p*, relatively large and conspicuous, sclerotised and darkened, appearing about as shown.

Holotype, ♂, Quetta, northern Baluchistan, April 1931 (*Haroonkhan*); returned to the Imperial Institute of Entomology, London.

This fly is readily told from all other regional members of the subgenus by the venation, especially the short oblique vein R_3 and the closed cell 1st M_2 . In the venation, the fly is somewhat more as in the subgenus *Gonempeda* Alexander, but from the structure of the male hypopygium it is a member of the typical subgenus.

TWO NEW SPECIES OF *PRISTOMYRMEX* MAYR (HYM.
FORMICIDAE), WITH SOME NOTES ON THE GENUS

By HORACE DONISTHORPE, F.Z.S., F.R.E.S.

Pristomyrmex castor sp. n.

♀. Orange yellow, shining, furnished with sparse outstanding yellow hairs, eyes and teeth of mandibles black.

Head without mandibles transverse, massive, broader than thorax, posterior angles rounded, posterior border slightly excised in middle, cheeks straight; *mandibles* powerful, triangular, rather widely and strongly longitudinally striate, with a few punctures in the interstices, armed with four strong blunt teeth, the posterior three being shorter and blunter; *clypeus* transverse, anterior border crenulate, rather flat posteriorly with a narrow raised central carina; *frontal area* ill defined with a narrow central carina and fine longitudinal striae on each side; *frontal furrow* narrow, shallow, extending half-way to median ocellus; *frontal carinae* diverging behind, embracing a rather broad flat space which is punctured with a few rather large shallow umbilicate punctures, a few faint not close longitudinal striae are present between eyes and antennal foveae; *antennal foveae* large, deep, round, and margined with a number of narrow, low, circular ridges; *ocelli* small, not prominent, situated on posterior part of top of head; *eyes* large, not very convex, slightly longer than broad, furnished with numerous facets; *antennae* 11-jointed, stout; *scape* curved, considerably widened to apex, not reaching as far as posterior border of head, *funiculus* with stout joints increasing in breadth to apex, first joint about as long as broad, the rest getting gradually longer than broad, last joint bluntly pointed, slightly longer than the two preceding taken together. *Thorax* short, convex, narrowed in front and behind, broadest at insertion of wings; *pronotum* transverse, very narrow anteriorly, embracing mesonotum at sides, sides punctured with wide apart shallow umbilicate punctures; *mesonotum* very convex on disc, anterior border narrowly margined, punctured with wide-apart rather large shallow punctures, suture between mesonotum and praescutellum narrow but deep; *praescutellum* very narrow in centre, rather wide at sides, with a few shallow round punctures; *scutellum* transverse, convex, punctured with a few scattered, large, shallow, umbilicate punctures; *metanotum* transverse, very narrow, slightly convex; *epinotum* armed with two short pointed teeth, *dorsal surface* convex, transverse, with three shallow punctures on disc situated one above the other, the lowest being the broadest, a transverse furrow is present before excised ridge separating the declivity, *declivity* very smooth and shining, considerably hollowed out, with raised side margins. *Petiole* long with long peduncle, sides of peduncle almost straight to just before base where a short projection is present on each side, node high, broader than peduncle, convex and rounded above, sides almost straight, apical border truncate; *post petiole* convex and rounded above, broader than node of petiole, broadest just before apex, with a very small, short tooth beneath. *Gaster* convex, round oval, narrowed behind, very smooth and shining. *Legs* stout, moderate, *claws* rather long and narrow. *Wings* as in the ♂, but more ample. *Long.* 8 mm.

Described from two winged females taken by Miss L. E. Cheesman, Papua, Kokoda, 1200 ft., one in April, the other in October, 1933.

Type in the British Museum (N.H.).

This is probably the largest species in the genus. It comes nearest to *P. parapunctatus* Emery from New Guinea, which has been taken by Mr. G. E.

Bryant also at Penang. *P. castor* is a little larger, lighter in colour, and the wings are considerably darker. In *parampunctatus* the puncturation is much more marked; being closer, stronger and coarser.

♂. Head, thorax, petiole, post petiole, antennae except scape, first joint of funiculus, and extreme tip of last joint, black; gaster yellow, legs, scape, first joint of antennae and extreme tip of last joint reddish-yellow; clothed with longer and shorter more or less outstanding black hairs.

Head not including eyes a little longer than broad, sides of head behind eyes rounded to posterior angles, posterior border slightly rounded; *cheeks* short, rounded beneath, slightly narrowed from eyes to base of clypeus; *mandibles* very short, small, triangular, sharply pointed, space between very wide; *clypeus* transverse, narrow, convex in middle, anterior border almost straight, with a finely raised narrow margin; *frontal carinae* short, low, rather wide apart, divergent behind; *eyes* large, convex, longer than broad, situated at sides of head; *ocelli* moderate; *antennae* long, 12-jointed, *scape* short, smooth, shining, rather stout, not as long as the first two joints of the funiculus taken together, *funiculus* with first joint smooth and shining, very short, about as long as broad, the rest of the joints pubescent and hairy, considerably longer than broad, last joint about as long as the two preceding taken together, slightly broader and pointed at apex. The puncturation of the head consists of fairly large shallow pits, surrounded by a network of raised borders, widely transversely striate between base of scape and eyes, spaces between the striae smooth and shining; a smooth shining space is present on vertex of head. *Thorax*, short, convex, narrowed in front and behind, broadest before insertion of wings. The puncturation is similar to that of head, but somewhat coarser, the pits being slightly larger; *pronotum* transverse and narrow, separated from mesonotum by a narrow shining slightly raised border; *mesonotum* convex, narrowed in front, broadest before base, slightly overlapping the pronotum, a smooth shining space, considerably narrower behind, extends from anterior border to beyond middle; *mayrian furrows* very broad and shallow, with widely separated oblique striae; *parapsidal furrows* short, broad, but narrower than mayrian furrows, consisting of rather large shallow pits; *praescutellum* transverse, flat, anterior border straight, with seven raised ridges extending to anterior border of scutellum, spaces between smooth and shining; *scutellum* transverse, convex, projecting, narrowed to, and rounded at, base, broadest before middle, punctured with round, shallow, fairly large pits; *metanotum* transverse, narrow, smooth; *epinotum* armed with two short pointed but not sharp teeth, the space between circularly excised, *dorsal surface* convex, with a number of longitudinal raised ridges, spaces between smooth and shining, the central pair diverging to base of teeth, a transverse ridge extends from one to the other before base, *declivity* concave, hollowed out, smooth and shining, slightly longer than dorsal surface. *Petiole* long, with peduncle narrower, but about as long as node, smooth, shining and flat above, sides narrowly bordered, node oblong, convex but not high, smooth and shining above, sides slightly rounded, punctured with small shallow pits; *post petiole* slightly longer than broad, about as broad as petiole, smooth and shining above, sides slightly rounded, anterior border slightly excised, beneath a small tooth projecting forwards is present at base; *gaster* long, oval, sides rounded and narrowed to base, smooth and shining. Stipites somewhat broad, bluntly pointed. *Legs* long. *Wings* blackish, hairy, *pterostigma* and *veins* dark brown, one *cubital cell* present, *radial cell* open. *Long.* 6.5 mm.

Described from a single male taken by Miss L. E. Cheesman, Papua, Kokoda, 1200 ft., August 1933.

Type in the British Museum (N.H.).

Although not actually taken with the two females described above, I have little doubt that it is the male of *castor*.

Pristomyrmex pollux sp. n.

♂. Black, shining, legs and antennae brown, apex of scape, first joint of funiculus and articulations of legs lighter, clothed with abundant long outstanding black hair. Head and thorax closely punctured with larger and smaller shallow punctures.

Head without eyes rather narrow and longer than broad, rather high in profile, posterior angles bluntly angled, posterior border with a narrow raised border, slightly excised in middle; *mandibles* very short, small, pointed, widely distant; *clypeus* small, convex, strongly arched in middle, anterior border projecting in centre; *frontal carinae* short, low, rather close together, slightly divergent behind, a small oval longitudinal smooth space is present on top of head before ocelli; *ocelli* fairly large, prominent, situated on top of crown of head; *eyes* very large, oval, prominent, situated on each side of the head; *antennae*: right antenna abnormal, 11-jointed, last joint thickened and curved, left antenna normal, 12-jointed, scape and first joint of funiculus smooth and shining, rest of joints pubescent, *scape* cylindrical, longer than broad, as long as the two first joints of the funiculus taken together; *funiculus* with first joint short, as long as broad, all the rest longer than broad, last joint as long as the two preceding taken together. *Thorax* short, narrowed in front and behind, broadest at insertion of wings; *pronotum* transverse, narrow in front with a short neck, sides triangular, rather long and wide, projecting slightly over pronotum; *mesonotum* ample, convex at apex, rather flat at base; *mayrian furrows* wide and strongly marked, consisting of rather large deep punctures separated by narrow ridges; *praescutellum* rather broad at sides, some eight narrow longitudinal ridges connect it with scutellum; *scutellum* transverse, not higher than mesonotum, base rounded, extending above metanotum, a rather deep transverse furrow, which is longitudinally striate, is present on each side at base; *metanotum* transverse, narrow, smooth and shining; *epinotum* armed with two fairly long triangular teeth, rather broad at base, *dorsal surface* slightly concave, margined on each side with two longitudinal ridges, a narrow transverse ridge connects them before space between teeth, and two similar ridges are present between teeth, *declivity* considerably hollowed out, smooth and shining. *Petiole* long, node broader than peduncle but neither broad nor high, smooth and shining on disc, considerably punctured at sides, posterior border truncate; *post petiole* a little longer than broad, about as broad as node, smooth and shining on disc, punctured at apex and sides, a blunt short tooth projecting downwards is present beneath at base; *gaster* smooth and shining, long, oval, narrowed at apex, truncate at base. *Stipites* not broad, bluntly pointed. *Legs* moderately long and slender. *Wings* brown, hairy, *pterostigma* and *veins* dark brown, one large cubital cell, and radial cell open, present. *Long.* 5.3 mm.

Described from a single male taken by Mr. G. E. Bryant at Penang, 6 November, 1913. I think it is improbable that the above described insect is the male of any known species. It is true that Bryant took the female of *P. parampunctatus* Emery at Penang, but one would expect the male of that species to be larger, and also in part to be yellow in colour.

Type in the British Museum (N.H.).

Only three males of *Pristomyrmex* species have been described heretofore—*P. brevispinosus* Emery 1887, *P. obesus* Mann in 1919 by W. M. Mann from the Solomon Islands, and *P. pungens* Mayr in 1928 by Wheeler. Forel's ♂, 1912, of *P. picteti* Emery appears to be doubtful.

Mayr created the genus *Pristomyrmex* for the reception of *P. pungens* Mayr ♀ 1866. Emery (1922) unfortunately gave the date for *pungens* as 1886, although he had correctly given that of the genus as 1866. Forel redescribed *pungens* under the name of *P. japonicus* ♀, 1900, from Japan. Of course his name sinks as a synonym.

The distribution as given by Emery (1922) is as follows: "Indo-China, Japon, Malaisie jusqu'à la Nouvelle-Guinée, Australie." Since then, however, two species have been described from East Africa, by Arnold and Karawajew respectively. Arnold made no comment on the curious fact that a species of *Pristomyrmex* should be found in Africa. Karawajew, however, who was evidently unaware of Arnold's species, remarks that the discovery of a species in British East Africa is very remarkable and widens our knowledge of the geographical distribution of the genus.

Santschi (1923) writes: "*Pristomyrmex orbiceps* Sants. (1916) = *Xiphomyrmex orbiceps* Sants. (1914). *Pristomyrmex fossulatus* (For.) Sants. (1916) = *Xiphomyrmex fossulatus* For. (1918) (sic!). J'avais déjà signalé cette mutation dans le Bull. Soc. Ent. France p. 51 (1916) mais cela avait échappé à Mr. Emery dans ses 'Myrmicinae' du Genera Insectorum et dans Wheeler dans ses 'Ants of the Belgian Congo.' Le genre *Pristomyrmex* n'était pas encore connu en Afrique."

Forel, of course, described *Xiphomyrmex fossulatus* in 1910. These changes were also missed in the *Zoological Record*.

Emery in the *Genera Insectorum* (1922) lists thirteen species of *Pristomyrmex*, one subspecies, and three varieties. Since that publication the following new forms have been described: *P. africanus* Karawajew, ♀, 1931, British East Africa. *P. quadridens* Emery var. *aruensis* Karawajew, ♀, 1933. Curiously enough he again describes the same variety from the exact same locality in 1935. *P. cribarius* Arnold, ♀, 1926, Portuguese East Africa. *P. mendanai* Mann, ♀, 1919, Solomons. *P. obesus* Mann, ♂♀♂, 1919, Solomons. *P. obesus* Mann, subsp. *melanoticus* Mann, ♀, 1919, Solomons. *P. pegasus* Mann, ♀, 1919, Solomons. (It is rather extraordinary that Emery, in 1922, should have overlooked these last four forms.) *P. taurus* Stitz, ♀, 1925, Philippines. *P. picteti* Emery var. *tingiana* Stitz, ♀, 1925, Philippines. With the two new species described in this paper the list is brought up to twenty-three species (including the two species referred to by Santschi), two subspecies, and five varieties.

Very little is known about the habits of these ants; they are generally found singly, on the trunks of trees, under stones, etc. Mann found a small colony of *obesus* under a stone at Fulakora, Solomons, consisting of less than a dozen workers, a decolated female, and one male.

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NEW ETHIOPIAN AND ORIENTAL DRAGONFLIES (ORDER ODONATA)

By Lt.-Col. F. C. FRASER, I.M.S. Rtd., F.R.E.S.

FORMING part of a large collection of Odonata made in Uganda in 1927 by Professor G. D. Hale Carpenter, are five specimens of a new and interesting species belonging to the genus *Oxythemis* Ris.

This genus was described by its author in the year 1909 from a single male specimen and has remained a monotypic one ever since. *Oxythemis phoenicosecles* Ris is from West Africa; the type, formerly in the Martin collection, is now lodged in the Paris Museum. It is described in 1909, *Cat. Coll. Selys, Libellulinen* 10 : 163, fig. 119, the figure depicting the wings, which differ only in the minutest details from those of the new species described below.

A second new dragonfly, described below, comes from Kuala Lumpur, Federated Malay States, and was taken by Mr. H. M. Pendlebury of the F.M.S. Museums. The species, which is a *Hemicordulia*, is represented by a single specimen which is unfortunately a female. One would hesitate generally before describing a new species from this sex but in this genus the two sexes are similarly marked and coloured and differ only in genital characters so that the objection may be waived: moreover there seems small chance of the male being discovered for many years, the female having been taken over twelve years ago in a district in which intensive collecting has been carried on for many years. The capture of this specimen was a pure chance, the creature having come to "light," a rare circumstance in this Order.

Oxythemis carpenteri sp. n.

Male : Abdomen 21 mm. Hind-wing 24 mm.

Head : labium very pale ochreous unmarked; labrum of similar colour but the middle part of its base, the whole of the clypeus and the lower part of sides of frons pale olivaceous : rest of frons rather sharply demarked a darker olivaceous : vesicle dull coppery crimson : occiput very small, dark reddish to ochreous : behind eyes and head bright ochreous. Prothorax dark reddish-brown on dorsum and laterally, this colour thinly pruinosed. Low down on the sides and including the coxa and trochanter, bright ochreous. Posterior lobe small, bilobate, fringed with long pale hairs. Thorax on dorsum and for the upper three-fourths of the sides black but appearing purplish-blue in the adult due to a thin overlay of pruinescence (this colour is best likened to that of a ripe damson with the bluish-purple bloom on it). Lower parts of sides and anterior part of pectus bright citron yellow, contrasting sharply with the dark colouring above it. Posterior part of pectus dirty white or palest olivaceous, this area again sharply defined from the anterior citron yellow. Legs black on flexor surfaces, bright citron yellow on extensor, but the latter colour partly obscured on the tibiae of the middle and hinder pairs of legs. Tarsi and claws black. Wings hyaline, apices tipped for a variable extent with reddish-brown, this extending inwards at the most to distal end of pterostigma : a small golden-yellow spot at base of hind-wings, not quite extending to the cross-vein Ac and ending well short of the tornus. Pterostigma 2.75 to 3.0 mm. long, bright ochreous bordered by thick

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blackish-brown nervures, especially costalwards. Discoidal cells of fore-wings traversed once, those of the hind-wing entire; nodal index— $\frac{6-9}{7-8} \mid \frac{11-7}{9-7} \mid \frac{7-10}{8-9} \mid \frac{10-7}{8-7}$; all hypertrigones entire, subtrigones in fore-wings 3-celled; only one cubital cross-vein in all wings; discoidal field in fore-wing begins with a row of three cells and is continued as rows of 2 for three or four rows; CuP in hind-wing at anal angle of discoidal cell; arculus opposite the 2nd antenodal but more often between the 2nd and 3rd. All antenodal and postnodal cross-veins and many adjacent cross-veins pale yellow, the remaining veins black. Membrane pale yellow. Other details similar to that of *O. phoenicosceles*. Abdomen narrow, tapering very slightly and evenly towards the end, strongly keeled, dark purplish-black

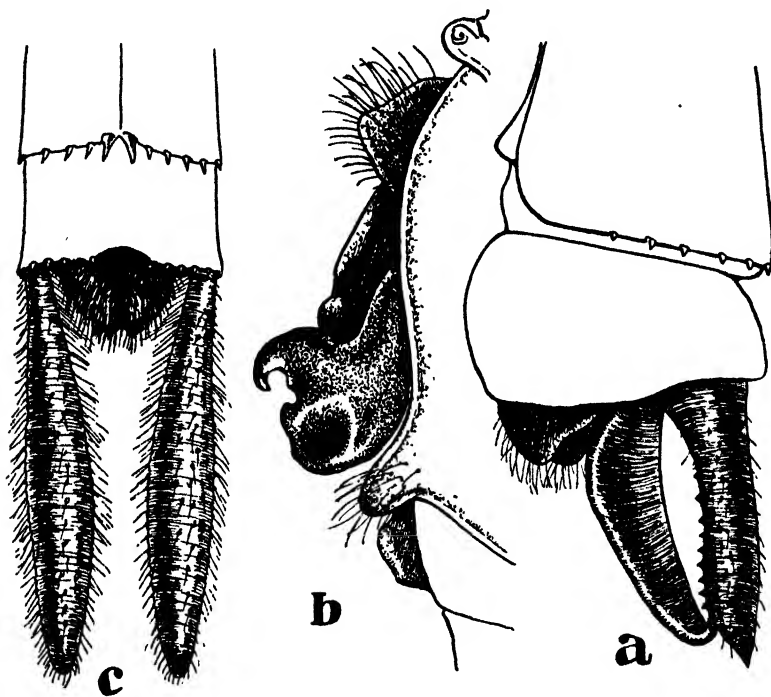


FIG. 1.—a. Anal appendages of *Oxythemis carpenteri* sp. n., seen from the left side. b. Secondary genitalia of same seen from the left side. c. Anal appendages of *Hemiscordulia gracillima* sp. n., dorsal view.

due to thin pruinescence: pale greenish-yellow beneath but with pale brownish paired apical markings on segments 3 to 8. Anal appendages black, simple, cylindrical, slightly constricted at base, slightly broadened at apex, which is acutely pointed: directed straight posteriorwards and but slightly curved and with a row of robust spines on ventral border to the number of 8 or 9: inferior appendage but slightly shorter than superiors which equal segment 9 in length. Secondary genitalia: lamina hood-shaped, projecting moderately, hamules robust, hooks shaped like a partially opened parrot's beak, lobe very small, overlapped by the hamules.

Female. Abdomen 20–21 mm. Hind-wing 24 mm.

Head similarly coloured to male but rather paler, the distinction in colour between clypeus and frons much less marked. Prothorax pale ochreous with obscure brownish

clouding on dorsum: posterior lobe much smaller, quadrate. Thorax dull olivaceous brown on dorsum, pale greenish-yellow laterally and beneath, the only dark marking being a narrow sharply defined blackish-brown humeral stripe. Legs coloured similarly to the male. Wings hyaline, palely and evenly tinted with yellow, apices clear or tipped with brown as in the male, but the cell middles of this coloured apex clear: basal yellow spot of hind-wing smaller and paler. Pterostigma similar to the male: nodal index— $\frac{7-11}{7-10} \mid \frac{11-7}{8-8} \frac{7-10}{7-10} \mid \frac{9-8}{10-7}$: other details similar to those of male. Abdomen bright ochreous with narrow black apical annules on segments 3 to 8 and a very broad dorsal black stripe running from the base of segment 3 to segment 10, this stripe narrowing slightly basally on all segments from 3 to 7. Vulvar scales very minute, two tiny triangular structures in close contact less than 0.5 mm. in length. Anal appendages dark brown, slightly longer than segment 10, conical, pointed at apex.

Habitat: 3 males and 2 females, UGANDA: White Nile, R. Alla, Sept. 27, coll. G. Hale Carpenter.

This new species agrees in size and venation of wings with *phoenicosceles* but differs entirely in its markings and colouring. Thus in the latter the labrum is black, the labium broadly black in the middle, the face and frons are dark reddish-brown, the latter dull blue metallic above, the thorax is black with a median and two lateral reddish bands, the legs are blood-red and there are reddish spots on parts of the abdomen. All these contrast strongly with the purplish-black and citron yellow which are the dominating colours in *carpenteri*. *Type* male and allotype female will be deposited in the British Museum (N.H.), cotypes in the Fraser collection. The addition of this new species to *Oxythemis* calls for some slight modifications in the generic diagnosis. These are as follows:—Arculus at the 2nd antenodal up to midway between the 2nd and 3rd; CuP in hind-wing at or slightly separated from the anal angle of discoidal cell; Riii slightly and variably undulated. Vulvar scales minute inconspicuous triangular processes.

***Hemicordulia gracillima* sp. n.**

Female. Abdomen 33 mm. Hind-wing 30 mm. *Male* unknown.

Head: labium pale yellow, labrum and face ochreous changing to bright orange on front of frons: upper part of latter bluish-green metallic; vesicle and occiput dark reddish-brown, the former dully metallic; behind head and eyes glossy black. Prothorax dull brown. Thorax dark reddish-brown on dorsum below, metallic green on upper half. Laterally broadly metallic green traversed by a broad oblique median yellow stripe. Beneath bright ochreous with the metallic green invading it laterally at a point. The whole of thorax on dorsum and sides clothed with thick greyish hairs. Legs on the inner sides and the whole of the anterior pair of femora reddish-brown, outwardly black. Wings hyaline, the hind with a basal golden yellow marking extending outwardly to the first antenodal vein and just beyond the cross-vein Ac; membrane cinereous, bordered by yellow. Nodal index— $\frac{5-7}{6-5} \mid \frac{7-6}{5-6}$; other details as for genus; pterostigma very short, 1.5 mm. in fore-wings, 1.0 mm. in the hind-wings, black. Abdomen very long and *very slender*, less than 1.0 mm. wide for the greater part of its length, black inclining to reddish-brown on the sides of the first 2 segments. Anal appendages *very long*, 2.75 mm. (a great length for the female sex), longly fusiform in shape. Vulvar scales small, triangular or tongue-shaped with apices directed posteriorwards, slightly separated, about one-third the length of segment 9.

Habitat: FEDERATED MALAY STATES: Kuala Lumpur, 26.iii.32, coll. by H. M. Pendlebury, at "light."

This is the first record of a Corduline being taken at "light," and suggests that the insect may be crepuscular, although the family is essentially one of sun-lovers. The species by its small size and very slender build is probably closely related to *H. tenera* Lieftinck and *silvarum* Ris. The former is from Java and known only from a single male and differs from the present species by its face and frons being dirty olive brown, by the absence of a yellow lateral thoracic stripe and by the membrane being reddish. *H. silvarum* is from New Guinea and known from both sexes both of which have the wings coloured broadly yellow and the abdomen spotted with yellow. *H. oceanica* Selys agrees in colouring with this new species but the female has short anal appendages which serve to separate it at a glance. Only one other Hemicorduline is known from continental Asia, viz. *H. asiatica* Selys, which is a much more robust insect and in which the anal appendages of the female are short. The *type* belongs to the Federated Malay States Museums, but as things stand at present, it seems best to deposit it in the British Museum (Natural History).

Errata: In my paper on "The significance of vestigial oblique veins in the evolution of intercalated veins in the odonate wing, with the description of a new genus," *Proc. R. ent. Soc. Lond.* (B) 13, for "(Ac)" on line 9, page 60, read "(Ab)".

ADDITIONS TO THE LIST OF ODONATA OF THE EASTERN MEDITERRANEAN ISLANDS

By J. COWLEY, M.A., F.R.E.S.

IN 1940 I published a list of the Odonata of the eastern Mediterranean islands (*Proc. R. ent. Soc. Lond.* (B) 9: 172-178), although these islands were erroneously referred to in the title and in the text as being of the *western* Mediterranean area. Unfortunately I overlooked a paper by F. Werner, 1938 (*Ergebnisse der achten zoologischen Forschungsreise nach Griechenland* (Euboea, Tinos, Skiathos, Thasos usw.) *S.B. Akad. Wiss. Wien* (I) 147: 151-173), from whose records a number of additions must be made to the list. Omitting Euboea as being more properly included with the Grecian mainland, two species have to be added to the list (*Erythromma viridulum*, *Gomphus flavipes*), one species each to the lists for Naxos (*Ischnura elegans*) and Tinos (*Platynemis pennipes*), and records for no less than ten islands from which Odonata had not previously been recorded: Andros (1 species), Delos (1), Kythera (Cerigo) (2), Lemnos (3), Milos (1), Mykonos (1), Nikaria (Icaria) (1), Psara (1), Seriphos (1), and Skiathos (1). Comparison of the Odonate fauna of the islands of this area with that of adjacent areas would not be of much significance until there is more material available, and in particular it may be mentioned that the dragonflies of the adjacent areas are either imperfectly known, or include peculiar and interesting species or subspecies, so that even casual collections made by anyone who may be able to do so from the following regions would be of much scientific value and interest: Balkans, Asia Minor, Caucasia,

Turkestan, Iran, Iraq, Syria, Palestine, Egypt, North Africa. In some of these areas at least there is a marked tendency to form more or less distinct subspecies which still require careful study. It may indicate something of our lack of knowledge to note the numbers of species and subspecies recorded : E. Mediterranean Is. 40 (Crete 20, Corfu 13, Rhodes 10, other islands 6 or less), Cyprus 21, Syria 39, Palestine 42, all these areas together with Greece and Asia Minor at least 90 ; these figures are no doubt still far from complete.

The additional records given by Werner in the paper cited are as follows :—

Platycnemis pennipes pennipes (Pallas, 1771).

Platycnemis pennipes Werner, 1938 : 164. Andros ; Lemnos ; Tinos.

It is by no means certain whether the above records, and those previously listed by me (1940), really refer to subsp. *pennipes* or to subsp. *insularis*.

Ischnura elegans (Van der Linden, 1820).

(subsp. *ebneri* Schmidt, 1938 ?)

I. elegans Werner, 1938 : 164. Naxos.

Erythromma viridulum (Charpentier, 1840).

E. viridulum Werner, 1938 : 164. Mykonos.

Gomphus flavipes (Charpentier, 1825).

(subsp. *flavipes* ?).

G. flavipes Werner, 1938 : 165. Lemnos.

Orthetrum brunneum brunneum (Fonscolombe, 1837).

O. brunneum Werner, 1938 : 165. Kythera ; Lemnos ; Lesbos ; Milos ; Nikaria ; Seriphos.

Orthetrum coerulescens (Fabricius, 1798).

O. coerulescens Werner, 1938 : 165. SKIATHOS : Limeni.

Libellula depressa Linnaeus, 1758.

L. depressa Werner, 1938 : 165. Kythera.

Crocothemis erythraea erythraea (Brullé, 1832).

C. erythraea Werner, 1938 : 165. Delos.

Sympetrum meridionale (Selys, 1841).

S. meridionale Werner, 1938 : 165. Psara.

HABROCYTUS BEDEGUARIS THOMSON AND *H. PERICLISTI* SP. N.
(HYM., PTEROMALIDAE) REARED FROM GALLS OF *RHODITES*
ROSAE (L.)

By E. McC. CALLAN, B.Sc., A.R.C.S., D.I.C., Ph.D., F.R.E.S.

(Entomology Department, Imperial College of Tropical Agriculture, Trinidad, B.W.I.)

IN studying the community of insects inhabiting the galls of *Rhodites rosae* (L.) in England, large numbers of the Pteromalid parasites, *Habrocytus bedeguaris* Thomson and *H. periclisti* sp. n., were obtained. The latter is described herewith as a new species, and a supplementary description of *H. bedeguaris* is given for comparison.

Habrocytus bedeguaris Thomson.

This is a well-known species commonly reared from galls of *R. rosae*. Specimens examined agree well with Thomson's description (1876-78), and there can be no doubt as to its identity. Dr. O. W. Richards and Dr. C. Ferrière kindly examined specimens and confirmed the identification.

In all 486 specimens were examined, of which 175 were females and 311 males. *H. bedeguaris* appears to be restricted as regards host to *R. rosae*, and probably does not attack *Periclistus brandti* Ratzb., the Cynipid inquiline which commonly invades these galls.

For purposes of comparison with *H. periclisti* and to supplement Thomson's description, the following additional description of *H. bedeguaris* is given.

Female. Length 4.0-4.9 mm., typical specimens about 4.8 mm. Right mandible distinctly quadridentate, left mandible tridentate, the inner tooth truncate. Antennae (fig. 2) 13-segmented; scape just attaining level of front ocellus; pedicel about twice as long as broad at apex; two distinct ring segments of about equal size; funicle 6-segmented, the segments successively decreasing a little in length; first funicle segment almost twice as long as broad, the sixth only as long as broad; club of three fused segments which tapers from its middle to a point, about equal in length to the two preceding funicle segments. Fore-wings (fig. 1) a little more than twice as long as broad; marginal and stigmal veins subequal, the postmarginal approximately one and one-half times as long as marginal; basal cell and speculum bare, occasionally with a very few cilia in basal cell and more rarely in speculum, usually a conspicuous single row of about 10 cilia extending from subcosta and lying between basal cell and speculum.

Head and thorax black with blue metallic reflection; abdomen black with conspicuous purple metallic reflection; antennal scape yellow, the flagellum brown; mandibles yellow; coxae concolorous with thorax, trochanters brownish, femora concolorous with thorax, becoming brownish at distal ends, the tibia brownish with distal ends becoming yellow, tarsi yellow with last tarsal segment and claws brownish; wings hyaline, the venation brownish-yellow.

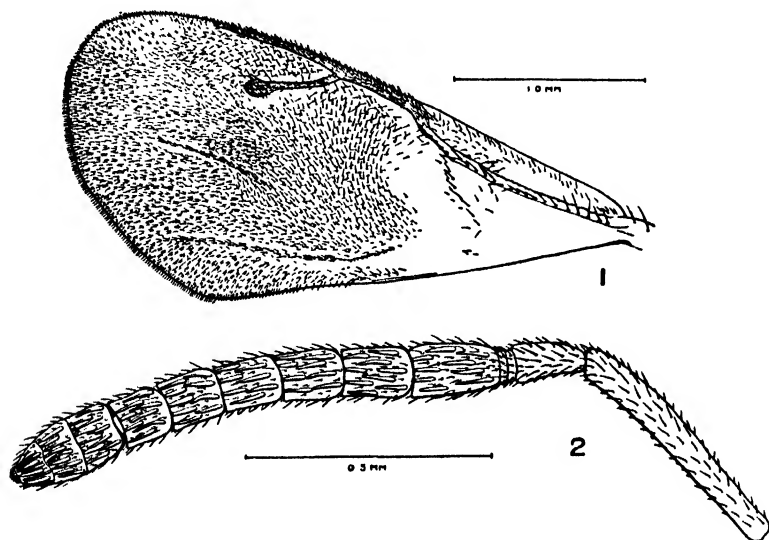
Male. Length 2.7-3.0 mm., typical specimens about 2.9 mm. Antennae almost exactly like the female in shape and proportions of the segments. Wings as in the female. Head, thorax and abdomen black with green metallic reflection, abdomen often with more or less distinct pale spot near base; legs usually somewhat paler than in the female.

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Specimens examined :—ENGLAND : various localities in South Buckinghamshire within 20 miles of Slough, reared from galls of *Rhodites rosae* (L.) as a parasite of this species, 175 ♀ and 311 ♂, May–June 1935 (*E. McC. Callan*).

Geographical distribution :—England, Sweden, Denmark, France, Austria, Yugoslavia, U.S.S.R., Canada (introduced) and U.S.A. (introduced).

The specimen from which this supplementary description was made and additional specimens will be deposited in the British Museum (Natural History), and further specimens will also be deposited in the United States National Museum.



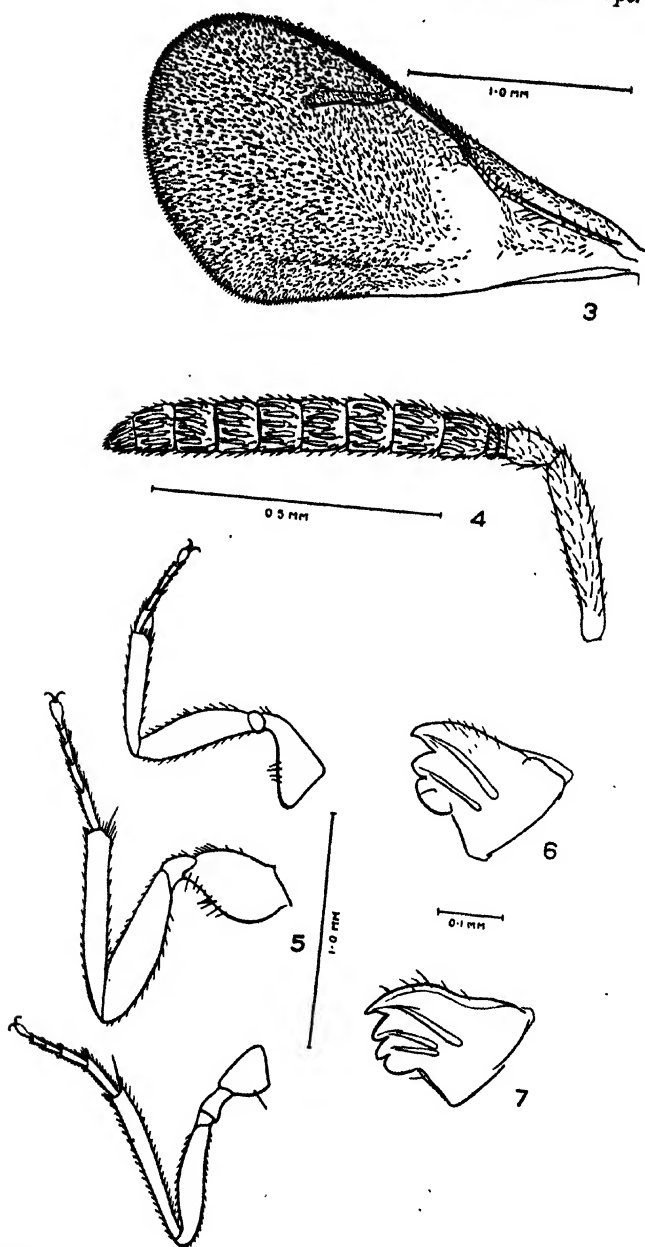
FIGS. 1-2.—*Habrocytus bedeguaris* Thomson ♀. 1, Fore-wing; 2, Antenna.

Habrocytus periclisti sp. n.

This species agrees in general facies with Thomson's description (1876–78) of *H. bedeguaris*, but it is markedly smaller in size and differs notably as regards the antennae and fore-wings. There can be no doubt that it is distinct, and it is therefore described as a new species. Specimens were kindly examined by Dr. O. W. Richards, and were also submitted to Dr. C. Ferrière, who was of the opinion that they were to be included in the genus *Habrocytus*, but were an undescribed species.

In all 958 specimens were examined, of which 470 were females and 488 males. *H. periclisti* shows a marked difference from *H. bedeguaris* as regards the host attacked. *H. periclisti* appears to be restricted for host to *Periclistus brandti* Ratzb., which occurs as a common Cynipid inquiline in the galls of *R. rosae*.

Female. Length 3.0–3.6 mm., typical specimens about 3.4 mm. Right mandible (fig. 7) distinctly quadridentate, left mandible (fig. 6) tridentate, the inner tooth truncate. Antennae (fig. 4) 13-segmented; scape not attaining level of front ocellus; pedicel about twice as long as broad at apex; two distinct ring segments, the first a little smaller than the second; funicle 6-segmented, the segments successively decreasing a little in length; first funicle segment only as long as broad, the sixth not as long as broad; club of three



FIGS. 3-7.—*Habrocytus periclisti* sp. n. ♀. 3, Fore-wing; 4, Antenna; 5, Fore, mid and hind legs; 6, Left mandible; 7, Right mandible.

fused segments tapering from its base to a point, a little longer than the two preceding funicle segments. Fore-wings (fig. 3) about twice as long as broad; marginal and stigmal veins subequal, the postmarginal about one and one-third times as long as marginal; basal cell densely ciliated with 45 to 60 cilia, speculum usually quite bare with occasionally one or two cilia.

Head, thorax and abdomen black with blue metallic reflection; antennal scape yellow, flagellum brown; mandibles yellow; coxae concolorous with thorax, trochanters brownish, femora brownish or in part concolorous with thorax, tibia and tarsi yellow with claws pale yellow; wings hyaline, venation brownish-yellow.

Male. Length 2.4–3.0 mm., typical specimens about 2.7 mm. Antennae and wings as in female. Head, thorax and abdomen black with green metallic reflections, abdomen usually with a pale spot near base; legs distinctly paler than in the female.

Specimens examined:—ENGLAND: various localities in South Buckinghamshire within 20 miles of Slough, reared from galls of *Rhodites rosae* (L.) as a parasite of the Cynipid inquiline, *Periclistus brandti* Ratzb., 470 ♀ and 488 ♂, May–June 1935 (*E. McC. Callan*).

Holotype ♀ Horton, Bucks, England, June 1935 (*E. McC. Callan*) and allotype ♂ Farnham Common, Bucks, England, June 1935 (*E. McC. Callan*); ♂ and ♀ paratypes. The holotype and allotype will be deposited in the British Museum (Natural History) and paratypes will be deposited there and in the United States National Museum.

Habrocytus bedeguaris and *Habrocytus periclisti* sp. n. can be separated by the following key:—

- (1) First funicle segment of antenna almost twice as long as broad; basal cell of wing bare *Habrocytus bedeguaris* Thomson.
- (2) First funicle segment of antenna only as long as broad; basal cell of wing densely ciliated *Habrocytus periclisti* sp. n.

ACKNOWLEDGEMENTS.

This work was carried out at the Imperial College of Science and Technology Biological Field Station, Slough, Bucks, England. I am greatly indebted to Dr. O. W. Richards and Dr. C. Ferrière, who kindly examined specimens for me, and to Miss Patricia Atteck for the care with which she has made the drawings illustrating this paper.

REFERENCE.

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A NEW ZEALAND PHASMID (ORTHOPTERA) ESTABLISHED IN THE BRITISH ISLES

By B. P. UVAROV, C.M.G., D.Sc., F.R.E.S.

IN 1910, Kirby (*Zoologist* 14 : 197) reported a female of a spiny stick-insect taken in 1908 by Mrs. M. F. Arbuthnot, out-of-doors at Fairlow, Paignton, Devon. The specimen is in the British Museum (Natural History), and was identified by Kirby, with some doubt, as *Macracantha geisovii* Kaup, a species described from New Zealand.

Another female of the same species was recently submitted to me for examination, by Messrs. Rowland Ward, to whom it was sent by Mr. George Penrose, Curator of the County Museum at Truro, Cornwall. The specimen was found, again out-of-doors, by Major A. A. Dorrien-Smith, D.S.O., at Tresco Abbey, Scilly Isles. The specimen belongs to the Truro Museum, but unfortunately it suffered damage during its return journey there.

TAXONOMY OF THE SPECIES.

There is no doubt that both females belong to the New Zealand species described by Westwood (1859, *Cat. Orth. Ins. Brit. Mus.* 1 : 48, pl. iii, figs. 2, 2a, 2b) under the name *Acanthoderus prasinus*. Kirby (1904, *Syn. Cat. Orth.* 1 : 340) removed this species, together with three others, from *Acanthoderus* Gray 1835 to a new genus, *Macracantha* Kirby 1904, but this name is pre-occupied in Arachnida by *Macracantha* Simon 1864 (*Hist. nat. Araignées* : 287), and I propose, therefore, to call the genus *Acanthoxyla* **nom. nov.**, with the following references :—

Acanthoxyla gen. n.

Acanthoderus Hutton 1899, *Trans. N. Zeal. Inst.* 31 : 56 (*nec* Gray 1835); *Macracantha* Kirby 1904, *Syn. Cat. Orth.* 1 : 340 (*nec* Simon 1864); *Acanthoderus* Brunner 1907, *Insektenfam. Phasm.* : 183, 238 (*nec* Gray 1835).

The genotype of *Acanthoxyla* is *Acanthoderus prasinus* Westwood 1859, as fixed by Kirby (*loc. cit.*) for his *Macracantha*, and the diagnosis of *Acanthoderus* by Brunner (*loc. cit.*) applies to *Acanthoxyla*.

Therefore, the species in question is to be known as *Acanthoxyla prasina* (Westwood 1859), and the Prickly Stick-insect might be suggested as an appropriate English name. Kirby (1910, *loc. cit.*), when recording the Paignton female as *geisovii* Kaup, apparently used Brunner's key to species in which *prasina* is characterised incorrectly as having the sternum unarmed, in flat contradiction to Westwood's original description and figures. It should be mentioned that *geisovii* was described only from a male, while no male of *prasina* is yet known. Even if they prove to be the two sexes of the same species, the name *prasina* will have priority over *geisovii*.

Two more nominal species of the genus are *suteri* Hutton 1899 and *fasciata* Hutton 1899, both from New Zealand, but further studies are needed to clear up their taxonomy and interrelations. In any case, *A. prasina* (Westwood)

remains the oldest known species and the two British specimens definitely belong to it.

BRITISH RECORDS.

The female taken at Paignton in 1908 was found on a climbing rose and the specimen reached the Museum in November, presumably soon after its capture. The second female was discovered by Major Dorrien-Smith at Tresco Abbey, Scilly Isles, when pruning loganberries on 11th November 1943, and a "quite immature specimen" was found by him, again on loganberry, in July 1944.

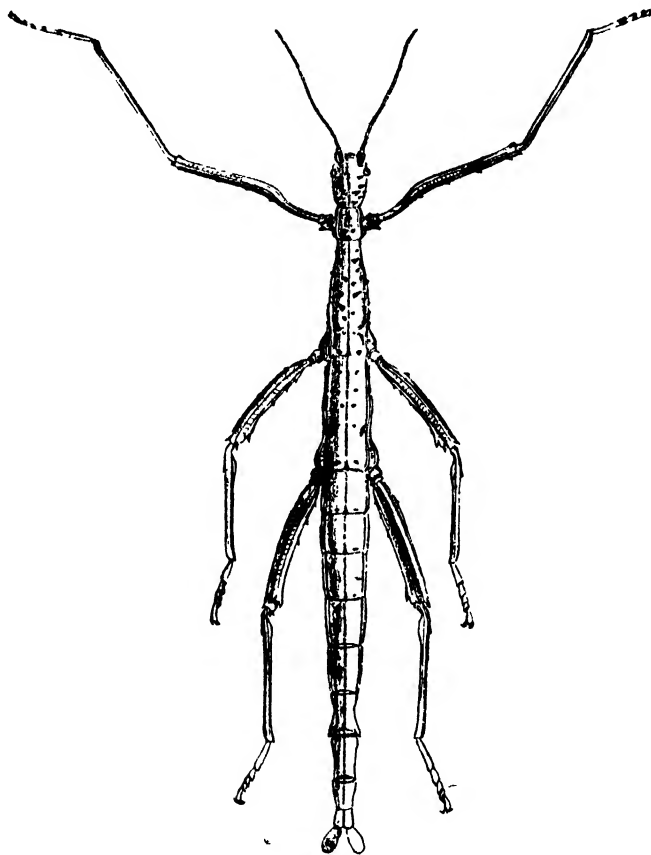


FIG. 1.—*Acanthoxya prasina* (Westwood 1859), female (after Westwood).

These records suggest that the species is able to live and to breed in this country out-of-doors and that adults may be found in the autumn, though there may be no definite seasonal cycle. The appearance of *A. prasina* in this country may well be the sequel to the importation of a large number of live plants into the Scilly Isles by Major Dorrien-Smith, from New Zealand in 1907 and 1909. Some of the plants imported in 1907 were distributed elsewhere, including Paignton. Thus it appears possible that the Prickly Stick-insect has been established on the South Coast and the Scilly Isles for the last 36 years, unless it has been imported again by someone else at a later date. Even if the latter

alternative is admitted, there has been, according to Major Dorrien-Smith, no importation of live plants during the war, so that the species must have been present at least for the last four years. Therefore, the species can be regarded as acclimatised in this country. This is not surprising, since many New Zealand plants are thriving here, and since the mean temperature of the coldest month (February) at Falmouth, Cornwall, is 39.5° F., exactly the same as that of July (the coldest month) at Dunedin, one of the coldest coastal stations in New Zealand, while at the Scilly Isles the mean February temperature is 45.3° F.

It may be asked why the Prickly Stick-insect, if established in this country, has not been more frequently recorded. It must be remembered, however, that all Phasmids are notoriously difficult to discover, and that many of them are more or less active only at night, and pass the day closely clinging to branches under foliage. It is quite probable that *A. prasina* will be found again on the South Coast and in the Scilly Isles, if naturalists look for it on various shrubs and climbers, more particularly on the prickly ones, such as roses, brambles and loganberries. An inspection of such plants with a lantern on warm nights when the insects are likely to be feeding may be especially recommended.

The adult female is easily recognised from the appended figure. It is of green colour, about 85–90 mm. (3½ inches) long and almost as thick in the middle as a pencil. The male, not yet known, should be smaller and more slender, but it is probable that the species reproduces itself parthenogenetically.

Should females be discovered, it would be advisable to keep them in captivity, feeding on the plant on which they were found, until eggs are laid and to try to hatch the young. If *A. prasina* proves an easy breeder, it would become a much more interesting insect for natural history classes, for keeping as a pet, and for laboratory investigations of various problems, than the common Stick-insect, *Carausius morosus* Brunner.

ACKNOWLEDGEMENTS.

I am grateful to Major A. A. Dorrien-Smith, Mr. George Penrose and Messrs. Rowland Ward, for the opportunity to put on record the first Phasmid established in this country.

NEW AND INTERESTING DYTISCIDAE (COLEOPTERA) FROM FIJI

By J. BALFOUR-BROWNE, M.A., F.Z.S., F.R.E.S.

*Dept. of Entomology, British Museum (Natural History).**Laccophilus seminiger* Fauvel.Fauvel, 1883, *Rev. d'Ent.* **3** : 337.

Ovalis, niger, capite, pronoto angulis anticis elytrisque apicibus flavo-testaceis; antennis, prosterno, pedibusque quattuor anticis flavis; metasterno, pedibusque posticis testaceo-piceis. Processu prosternali longissime, anguste, et longitudinaliter carinato. Sine lima coxarum posticarum.

Head flavo-testaceous, male quite shining, female less shining, very finely microreticulate, the meshes quite regularly rounded, more impressed in the female than in the male. *Antennae* flavous, the apical segment slightly infusate apically. *Pronotum* black, the anterior angles widely flavo-testaceous but not extending inwards from the inner edge of the eye, nor posteriorly much behind the middle of the lateral margin; surface microreticulate as on the head. *Elytra* black, the apices flavo-testaceous, microreticulate as on the head and pronotum, without trace of larger areoles; the three primary series of punctures fine and irregular; epipleurae of the male normally regularly attenuate from base to shortly before the apex; of the female of equal width from base to the level of the basal abdominal segment, then distinctly explanate and concave beneath and sharply regularly attenuate from the level of the hind angles of the third segment to just before the apex, the explanation being remarkably distinct in dorsal aspect. *Venter*: prosternum flavous, process very long, longitudinally carinate and narrow, laterally compressed; metacoxae and abdomen black, metasternum testaceo-piceous; sixth ventrite of the male deeply asymmetrically emarginate on the posterior edge, the middle of the emargination produced into a short rounded tooth; "lamellar-process" at the base of the sixth ventrite of the left side erect, terminally rounded, of the right side adpressed to the surface and terminally rounded; sixth ventrite of the female trilobate in the middle of the hind margin, the median lobe broader and terminally rounded, the lateral lobes narrower and acutely pointed, externally to the lateral lobes deeply symmetrically emarginate.

Long.: 4.34–4.67 mm. Lat.: 2.37–2.56 mm.

FIJI: Viti Levu, Namaka, 8.xii.1943, "Pool," 1 ♂, 2 ♀.¹

This species was originally described on a unique male from New Caledonia. I have published some remarks (1939, *Ann. Mag. nat. Hist.* (11) **3** : 99, figs. 1a, 2a) and a figure of the aedeagus of a further single male from AUSTRALIA: Arnhemland, Adelaide River (*J. J. Walker* leg.). The three specimens before me, comprising 1 male and 2 females, appear to justify a fresh description and comparison of the sexes, the females being the first seen. The explanate epipleurae are an unexpected feature of the female among Old World species and readily separate the species from all others of Sharp's Group 6. The occurrence of this species in Fiji further accentuates the Northern Australian or "Papuasian" affinities of the aquatic coleoptera of the islands which I

¹ All collections are due to R. A. Lever, Entomologist, Dept. of Agriculture, Suva.

have discussed in a paper on the Aquatic Coleoptera of Oceania (Berenice P. Bishop Museum Occ. Pap., *in press*).

Fauvel's types have never been available for examination and in these circumstances the identity of the species cannot be absolutely certain, but I have very little doubt of the correctness of the ascription and accordingly I am selecting one of the two females above described as being a standard specimen of that sex in the sense of, but not designating as, a "neallotype."

***Bidessus leveri* sp. n.**

Elongato-ovalis, apicaliter attenuatus; flavus, elytris fusco-flavis; mas politus et nitidissimus, femina pingucula; caput sine stria post ocula transversa; plica thoraco-elytrorum recte; elytris confertim punctatis versus suturam usque ad plicam, inter plica margineque regulariter tenuioribus punctatis; omnino sine stria suturali.

Head flavous, anteriorly short and widely rounded, finely and sparingly punctulate; antero-laterally with a shallow punctured depression on each side but without trace of a feebly raised transverse ridge or pair of tubercles antero-medially; eye facets not delimited by a finely impressed line in the male, distinctly delimited in the female. *Antennae* of the male longer, 5th to 10th segments evidently moniliform, longer than broad, of the female shorter, 5th to 10th segments clearly as broad as long and shorter than in the male, dorso-ventrally flattened. *Pronotum* transverse, sides straight basally, weakly regularly convergent anteriorly, posterior angles rectangular; laterally distinctly margined at the base, the margin continuing to the anterior angles but progressively finer and less distinct; on either side of the produced scutellar area with a straight plica attaining quite to the middle; very finely and very sparingly punctured. *Elytra* largely fusco-flavous, the base externally to the basal plicae, the side margins widely and the apex flavous; the basal plicae twice as long as the thoracic plicae, quite straight; near the suture strongly and distinctly punctured, externally more finely and sparingly punctured, the surface between highly polished in the male, with a greasy sheen in the female but without visible sculpture even under the highest magnifications; the demarcation between the stronger punctures near the suture and the finer punctures near the margin is quite sharp and is limited by a continuation backwards of the basal plicae. *Venter*: rufo-fuscous, the prosternum flavous; the prosternal process long, with distinct margins and a median longitudinal shallow convex ridge; metacoxal processes apparently abruptly truncate due to an abrupt small declivity, the coxal articulation not extending mesad of the coxal lines. *Legs* flavous, the three basal segments of the anterior and intermediate tarsi of the male evidently wider than in the female and the claws longer and more curved.

Long.: 2.10-2.26 mm. Lat.: 1.05-1.11 mm.

FIGI: Viti Levu, Namaka, 8.xii.1943, "Swamp," 3 ♂, 1 ♀. Nadi, 10.vi.1943, 1 ♀. Same locality, 21.viii.1943, 1 ♀. Navua, 17.xi.1943, 2 ♂. Delainavesi, 2.xii.1943, 1 ♀.

This new species might be mistaken for *B. compactus* (Clark) from Australia or *B. neoguineensis* Rég. from New Guinea (the latter appears to be a subspecies of the former) and it is extremely closely related thereto by the structure of the parameres of the aedeagus, absence of the transverse stria of the vertex, straight thoraco-elytral plicae, absence of sutural stria of the elytra and general form.

It may be distinguished from *compactus* by the shorter head, much more widely rounded in front, the entire absence of the feebly raised transverse ridge near the anterior margin of the head, which is quite conspicuous in the compared species; the thoracic plicae attain the middle of the pronotum and the elytral

plicae are conspicuously longer; the elytral punctation is stronger and the female has a greasy sheen; the prosternal process is narrower, the pro- and meso-tarsi of the male are broader, the male antennae longer and more slender and the median lobe of the aedeagus is regularly attenuate from the base to the acutely pointed apex whereas in *compactus* it is parallel-sided in the apical two-thirds, then abruptly narrowed and again parallel-sided to just before the apex where it is again abruptly narrowed to the very short, parallel-sided rounded apical piece. The metacoxal processes of *compactus* are gently declivous at the apex, not abruptly so as in *leveri*, so that the apex does not appear transversely truncate as in the new species.

***Bidessus fijiensis* sp. n.**

Elongato-ovalis, postice regulariter curvatus attenuatus; flavo-testaceus, fronte et macula irregulare indistincteque in elytris fusco; capite stria transverse tenue ad verticem; pronoto utrinque plica longe S-sinuata usque ad medium attingente, in elytris continuata plica recte; sine stria suturali; antennis distincte incrassatis, segmentis quinto sextoque dilatatis et dorso-ventraliter compressis.

Head flavous, the frons fuscous, the vertex smoky, with a very fine transverse vertical furrow, the surface finely and moderately densely punctulate; the anterior part of the fronto-clypeus on either side very shallowly impressed. *Antennae* long, the fifth and sixth segments markedly incrassate and dorso-ventrally flattened, the eleventh segment long, about as long as the three preceding segments taken together. *Pronotum* transverse, the sides weakly rounded and finely margined, widest about the middle; unicolorous, flavous, very finely and sparingly punctulate, the surface with a greasy sheen; on either side at base with a sinuous plica quite attaining to the middle. *Elytra* ovate, the sides weakly rounded, fuscous, behind the shoulder widely, the apex narrowly and two vague spots on each side behind the base smoky flavous; the surface finely, moderately closely and regularly punctulate, the inner systematic series of larger punctures moderately distinct. *Venter*: black, abdomen fusco-flavous. *Legs* flavous or smoky flavous. Male unknown.

Long.: 2.89 mm. Lat.: 1.39 mm.

Fiji: Viti Levu, Namaka, 8.xii.1943. Unique ♀.

This new species appears to be most nearly related to the New Zealand *B. huttoni* Sharp in general structure and appearance. The remarkably strongly incrassate antennae exceed anything I have hitherto seen in the genus and readily distinguish the species from all other Oceanian Bidessini. The description of *H. dorsoplagiatus* Fairm. (1881, *Ann. Soc. ent. France* (6) 1: 249 nec *H. dorsoplagiatus* Fairm. 1880) (= *B. fairmairei* Van den Brand.) from "Iles Viti" might possibly be drawn from a male of this species but there are a number of discrepancies which appear to go beyond the differences of sex and accordingly, in the existing impossibility of examining Fairmaire's type, I have treated the present insect as undescribed.

***Rantus vitiensis* sp. n.**

Elongato-ovalis, sat convexus, nitidus, subtus niger; antennis pedibusque rufo-nigris; supra caput nigrum vel nigropiceum, postice transverse rufo-bi-maculatum, labro rufo; prothorace nigro-piceo, ad latera vage rufescente; elytris rufo-testaceis, cerberrime nigro-irroratis, seriebus tribus longitudinalibus punctorum magnorum; tarsis posticis longis, articulum basale interne prope marginem inferiorem punctis serialibus setiferis, unguiculo interno quam externo haud duplo longiore. Mas, segmentis tribus basalibus tarsorum anteriorum intermediorumque dilatatis, unguiculis simplicibus, aequalibus.

Long.: 10.0-11.0 mm. Lat.: 5.0-5.5 mm.

FIJI: Viti Levu, Nadarivatu, 24.vi.1941, 2 ♂, 1 ♀; same locality, 25.vi.1941, 1 ♂; same locality, 14.x.1942, 1 ♂, 2 ♀; same locality, 17.i.1943, 1 ♂, "stream."

This new species appears to be most nearly related to *R. pacificus* (Boisd.) from the Sandwich Islands and resembles it in appearance more than the other species found in Oceania and Melanesia. It may be distinguished by the much more shining aspect owing to the less impressed meshes of the elytral reticulation and the virtual absence of the fine punctation, which is of extreme fineness and only distinguishable under a high magnification in the area between the suture and the discal row of systematic punctures to about half the length of the elytron; the much finer and less impressed thoracic reticulation; the greater and more extensive thoracic infuscation; the much larger punctures of the systematic series of the elytra, which appear to be somewhat aggregated in comparison with those of *pacificus*; the posterior (inner) face of the posterior tibiae possesses a distinctly unilinear series of fine setiferous punctures in addition to the coarse punctures bearing flattened, apically bifid, spines near the dorsal face, whereas in *pacificus* the fine setiferous punctures are very numerous, covering most of the middle of the posterior face and not linearly disposed; lastly, by the presence on the lower, inner face of the basal segment of the hind tarsi of a complete series of setiferous punctures which almost delimit a third face to the segment, a feature not found in *pacificus* and not so completely developed in any other species of the genus known to me, rarely present to the extent of a few setiferous punctures to the number of two or three in a few species, e.g., *marmoratus* (Perr.) and *sexualis* (Zimm.).

A NEW SPECIES OF *BOTHRIOMYRMEX* EMERY (HYM. FORMICIDAE), AND SOME NOTES ON THE GENUS

By HORACE DONISTHORPE, F.Z.S., F.R.E.S.

Bothriomyrmex salsurae sp. n.

♀. Dirty pale yellowish-brown, legs and antennae lighter, tibiae, tarsi, scapes and apex of antennae pale yellow, teeth of mandibles and eyes black, shining, clothed with fine greyish pubescence, a few short outstanding hairs are present on the clypeus, mandibles, and gaster.

Head slightly longer than broad, slightly narrower in front than behind, sides almost straight, posterior angles rounded, posterior border excised; *mandibles* triangular, punctured, masticatory border armed with three sharp teeth at apex, the first and third (counting the apical one as the third) longer than the second, the apical one being the longest, a small tooth or dentule is present just before the first tooth and a few dentules are indicated towards and at base; *clypeus* large, convex, anterior border rounded; *frontal area* not distinctly defined; *eyes* rather small, round, flat, situated at about the centre of the sides of the head, near to but not touching the lateral borders when viewed from above; *antennae* fairly long, *scape* only extending slightly beyond the posterior border of the head, *funiculus* with first and second joints evidently longer than broad, the first being longer than the second, the third to the tenth about as broad as long, last joint about as long as the two preceding taken together. *Thorax*, somewhat thick, broader in front than behind, con-

tracted behind pronotum; *pronotum* large, transverse, convex, sides and anterior angles rounded; *prosternum* forming a neck anteriorly; *mesonotum* circular, about as long as broad; *epinotum* longer than broad, narrowed behind, sloping to base, without a distinct angle between dorsal surface and declivity. *Scale of petiole* not very high, longer than broad, narrowed to base, apex bluntly pointed and showing a tendency to being slightly excised; *gaster* short oval, broadest at base, rounded anteriorly, narrowed to apex. *Legs* moderately long. *Long.* 2.5–2.7 mm.

♀. Black, shining, legs, antennae, and mandibles brown, apex of antennae and tarsi pale brownish-yellow, clothed rather thickly with yellowish-white pubescence; whiter and thicker on cheeks, and some short yellow outstanding hairs, especially on mandibles and gaster.

Head slightly longer than broad, narrowed anteriorly; sides behind eyes convex and rounded, posterior angles rounded, posterior border distinctly emarginate; *mandibles* massive, triangular, punctured, armed with one rather long curved tooth at apex and a small tooth just before it; the rest of the masticatory border faintly serrate; *clypeus* large, transverse, rather flat, anterior border rounded, *frontal area* not indicated; *eyes* large, round oval, very slightly convex, situated on each side of the head before the centre, touching the lateral borders when seen from above; *ocelli* very small, situated on top of posterior part of head near posterior border; *antennae* long, *scape* extending a little beyond the posterior border of the head, *funiculus* with first two joints distinctly longer than broad, the 1st joint narrower but if anything slightly longer than the second, 3rd joint about as long as broad, 4th–10th slightly longer than broad, last joint very slightly longer than the two preceding taken together. *Thorax* large, massive, somewhat flat above, broadest across anterior angles, narrowed to base; *pronotum*, transverse, narrow, anterior border slightly raised, *prosternum* forming a neck; *mesonotum* large, transverse, flat, rounded anteriorly and posteriorly; *praescutellum* indistinct; *scutellum* large, transverse, flat, narrowed to base; *epinotum* about as long as broad, sides straight, dorsal surface convex, shorter than the declivity, declivity rather abrupt, but angle between it and dorsal surface not marked. *Scale of petiole* hexagonal, not large, anterior border emarginate, sides with shortly pointed angles, space between anterior border and angles excised, sides behind angles straight, narrowed to base. *Gaster* short, round oval, narrowed to apex. *Legs* fairly long. *Wings* iridescent, *pterostigma* and *veins* pale brown, one cubital cell, one discoidal cell, and rather narrow, long, not quite closed radial cell present. *Long.* 3.7–4 mm.

♂. Black, shining, mandibles, legs and antennae pale brown, tarsi and apex of antennae lighter, clothed with fine greyish pubescence and a few short yellow outstanding hairs.

Head transverse, narrowed before eyes, sides behind eyes rounded, posterior border truncate; *mandibles* long, narrow, crossed at apex when closed, armed with a sharp narrow tooth at apex, and the indication of a smaller tooth preceding it; *clypeus* transverse, convex, anterior border round and slightly projecting in centre, slightly sinuate on each side; *vertex* of head slightly concave; *eyes* large, oval, prominent, situated on each side of the head in front, close to posterior border of clypeus, but with an evident space between; *ocelli* fairly large, prominent, larger in proportion than those of the female, situated on top of posterior part of head which is slightly raised; *antennae* moderately long, narrow, *scape* extending as far as the median ocellus, all the joints of the *funiculus* longer than broad, first joint shorter than the rest, last joint not quite as long as the two preceding taken together. *Thorax* longer than broad, convex, narrowed in front and behind, broadest across middle of mesonotum; *pronotum* transverse, narrow anteriorly, sides extending round mesonotum to insertion of fore-wing; *prosternum* forming a neck; *mesonotum* transverse, convex, rounded in front and at sides; *praescutellum* not indicated; *scutellum* convex, narrowed to base, transverse anteriorly; *melanotum* very narrow, transverse, lower than mesonotum and epinotum; *epinotum* about as broad as long, narrowed slightly to base, dorsal surface convex, about as long as declivity, declivity slightly concave, angle

between the two gradual and not marked. *Scale of petiole* small, not high, about as broad as long, rounded above and at sides. *Gaster* long oval, narrowed in front and behind; *cerci* present. *Stipites* thin and curved with a hook inside half-way down; *volesellae* thin, curved, very sharp, the point bending slightly outwards; *sagittae* close together, curved and sharply pointed at apex. *Legs* fairly long. *Wings* as in the ♀ but smaller in proportion. *Long.* 2.5 mm.

Described from 22 workers, 9 winged females and 5 males taken by Mr. W. Pickles at Soud Arras in Algeria. Type, and male and female types, in the British Museum (N.H.). Mr. Pickles writes that the ants were taken on 11 December 1943, in a corner of the practically deserted superstructure of a nest of *Messor aegyptiacus* subsp. *canaliculatus* Donis. A few *Messor* crawled about, when the nest was disturbed, and tapped the smaller ants, but seemed indifferent to their presence.

The genus *Bothriomyrmex* was erected by Emery in 1869 for the reception of a species (♂ and ♀) which he had captured in the neighbourhood of Naples, and named *Bothriomyrmex costae*. Roger, however, in 1863, had described the worker of a species from Montpellier and Andalusia under the name of *Tapinoma meridionalis*, and Mayr in 1870 pointed out that this was the ♀ of Emery's *costae*. Consequently the name of the species is *Bothriomyrmex meridionalis* (Roger). Forel in 1894 described another species *B. atalantis* (♀) from North Africa.

Santschi, in 1911, described a new species, *B. decapitans*, from Kairouan, Tunis, which he had previously recorded in 1906 as *B. atalantis* Forel.

In 1915 Wheeler described a species under the name of *B. dimmocki* from Mt. Tom, near Springfield, Massachusetts, but according to Emery (1925) this is not a *Bothriomyrmex* at all, but a species of *Tapinoma*. He further states that the genus *Bothriomyrmex* is exclusively palaearctic and Indo-Australian.

In 1920 Santschi enumerated 10 species of *Bothriomyrmex*, describing seven new ones, of which he gave figures. As all the European and North African species possess 4-jointed maxillary palpi, whereas those from India and Australia possess only 2-jointed ones, he gave the subgeneric name *Chronoxenus* to the latter; but he failed to cite a type. I propose *Bothriomyrmex myops* Forel, 1895, ♂♀, from Sikkim, as type by present designation.

Emery, in 1925, in a paper on the European and oriental species of the genus *Bothriomyrmex*, when referring to Santschi's 1920 monograph of the genus, suggested that the European species were not known to that authority except from specimens from collections, and often in a bad state, chiefly represented by workers, which are very polymorphic and do not offer such distinctive characters as the females and males. The male genitalia, however, exhibit considerable variation. He then gave a list, with very precise descriptions and figures of all the European and Asiatic species, subspecies, and varieties (with their synonymy), which separate naturally into an occidental group (hispano-provençal) and an oriental group (Crimea, Caucasus?, Syria, Central Asia).

It is usually the case that the genera of parasitic ants are descendants from the genera of their hosts, but Emery considered that *Bothriomyrmex* is descended from *Iridomyrmex* and not from *Tapinoma*. He pointed out that the gizzard and the male genitalia resemble more closely those of the former than the latter. Furthermore, *B. scissor* Crawley, was taken by J. Clark in a nest of *Iridomyrmex innocens* Forel, in Australia. He thought that the first species of *Bothriomyrmex* was parasitic on species of *Iridomyrmex*. At the period when *Iridomyrmex* disappeared from the palaearctic fauna and was replaced by

Tapinoma (the former occur in the Baltic Amber, but the latter do not), *Bothriomyrmex* changed hosts, and became parasites on the *Tapinoma erraticum* group. Forel (1874) was the first to discover a mixed nest of *Bothriomyrmex-Tapinoma*. On 23 June 1871 he found the two species *Bothriomyrmex meridionalis* Forel (1894) nec Roger (1863) = *B. corsicus* Sants. subsp. *gallicus* Emery (1925), and *Tapinoma erraticum* Latr. living together under a stone "au dessus de Stresa (Iles Borromées)". He explained this as having been caused by an alliance of a queen of each species. The temporary social parasitic habits of certain ants had, of course, not been discovered at that date.

Santschi was the first to make known the colony-founding habits of this genus. The method employed by the Dolichoderine parasite *Bothriomyrmex decapitans*, which was first observed by Santschi at Kairouan in Tunis in January and February 1906, is as follows: The young queen after the marriage flight wanders about in search of a nest of *Tapinoma nigerrimum*, where she is seized and dragged into the nest by the workers. She is slightly attacked in the nest, but climbs on to the brood, or on the back of the queen, when she seems to be safe from attack. While on the back of the queen, she kills her by cutting off her head. After the death of the *Tapinoma* queen the intruder is accepted in her place. Eventually the host workers die off, and a pure *Bothriomyrmex* colony remains. The matter is facilitated by the fact that the female *Bothriomyrmex* possesses the shape, colour, and smell of the larger *Tapinoma* workers. This odour is most evident in the young queens, and Santschi has called it olfactory mimicry.

It seems fairly clear that the palaearctic species of *Bothriomyrmex* are temporary social parasites on forms of *Tapinoma erraticum* and *T. nigerrimum*, and those of the Indo-Australian fauna on species of *Iridomyrmex*.

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DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA) ¹

By Malcolm CAMERON, M.B., R.N., F.R.E.S.

***Atheta (Aloconota) inaequalis* sp. n.**

Moderately shining, black, the elytra yellow. Antennae black, the first two segments yellowish-brown. Legs yellow. Length 4 mm.

In the build of the head and thorax much resembling *luteipes* Er. but with longer, uneven elytra, much more sparingly punctured abdomen etc. ♂: head suborbicular, narrower than the thorax, the eyes large, about as long as the post-ocular region; disc with three superficial impressions, a pair behind the insertion of the antennae and another immediately behind them in the middle; punctures very small, flat and superficial, moderately close, in character much like those of *luteipes* but not so fine; ground sculpture distinct, coriaceous. Antennae constructed much as in that species but longer and stouter, 2nd and 3rd segments of equal length, 4th a little longer than broad, 5th as long as broad, 6th to 10th transverse, the penultimate about a half broader than long. Thorax very slightly transverse (4.2 : 4), the sides gently rounded in front, straighter and a little more retracted behind, the posterior angles rounded, the puncturation about as close but finer than on the head, the ground sculpture similar. Elytra longer (5.5 : 4) and broader than the thorax, slightly transverse (6.5 : 5.5), uneven, impressed on each side of the suture and more extensively on the disc; posterior angles not emarginate; sculpture fine, close and granular, the ground sculpture coriaceous. Abdomen practically parallel, very finely and very sparingly punctured throughout, the ground sculpture very fine and transverse: 7th tergite along the middle of the posterior half with a stout keel, 8th with rounded posterior margin in the middle with a pair of small obtuse teeth.

DARJEELING : Ghum district. Unique. In my collection.

***Atheta (Paraloconota) muscicola* var. *fuscata* v. n.**

Differs from the type form in the first two or three segments of the antennae and the femora and tibiae being pitchy.

KASHMIR : Khelanmarg, altitude 10,000 feet. My collection.

***Atheta (Metaxya) medialis* sp. n.**

Moderately shining: head black; thorax reddish-brown; elytra brownish-yellow; abdomen black, the first visible tergite reddish. Antennae black, the first two segments yellowish-red. Legs reddish-yellow. Length 2.75 mm.

Very near *connectens* Cam., similar in colour and build but a little smaller and narrower, the antennae similarly constructed, the head and thorax much more finely punctured. Head large, subquadrate, nearly as broad as the thorax, the eyes large, the disc broadly impressed and with fine median sulcus, extremely finely and closely punctured and with fine coriaceous ground sculpture. Antennae slender, all the segments longer than broad, decreasing in length, the 10th about a half longer than broad, the 11th as long as the 9th and 10th together. Thorax transverse (3.5 : 3), the sides straight behind and distinctly

¹ Continued from 1944, *Proc. R. ent. Soc. Lond.* (B) 13 : 52.

retracted, in the middle of the posterior half narrowly impressed, the puncturation close and finer than on the head, the ground sculpture similar. Elytra broader and longer (4 : 3) than the thorax, very finely and closely punctured, very finely coriaceous. Abdomen parallel, closely and much less finely punctured than the elytra, sparingly on the 5th visible tergite, the ground sculpture fine and transverse, pubescence yellow rather long, that of the fore parts finer and shorter.

DEHRA DUN : Song River. Unique. My collection.

***Atheta (Metaxya) congruens* sp. n.**

Very near *thinoecioides* Cam., of the same build, colour and lustre but smaller and narrower, the antennae a little shorter but similarly constructed, head and thorax with fewer and less distinct punctures, the latter more broadly and more superficially impressed in the middle, the abdomen more finely and less closely punctured. Length 2.1 mm.

♂ : 8th tergite truncate : 6th sternite a little produced but not narrowed, broadly rounded behind.

♀ : 8th tergite with small arcuate emargination in the middle of the posterior margin.

SIWALIKS : Lachiwala, Mothronwala, River Song, Saiya. In stream shingle. Type in my collection.

***Atheta (Ousipalia) pseudocaesula* sp. n.**

Size, build and colour of *caesula* Er., the antennae similarly constructed, but more shining, the head with narrow impression on the disc, the puncturation very fine but more evident, the ground sculpture less distinct; thorax much less finely punctured. Elytra as long as the thorax, rather more finely punctured than in *caesula*, the abdomen scarcely differing in the two species.

KASHMIR : Gulmarg. A single specimen in my collection.

***Atheta* (s.str.) *championi* sp. n.**

Size, build, colour and lustre of *dilutipennis* Motsch. but with the antennae entirely reddish-yellow and the puncturation of the thorax closer and distinctly rougher and less fine, elsewhere scarcely different. The antennae except for the colour, similar. Length 2 mm.

♂ : unknown.

KUMAON : Haldwani district (*Champion*). Unique. British Museum (N.H.).

***Atheta (Dimetrota) deprava* sp. n.**

Colour of *sublaevana* Cam., the antennae shorter but similarly constructed, with the head, thorax and elytra rather closely and distinctly roughly punctured, much less finely than in *sublaevana*, the thorax shorter and so more transverse, the abdomen much more closely punctured and pubescent throughout, the tibial setae much shorter. Length 2.75 mm.

KASHMIR : Gulmarg. Unique. My collection.

***Atheta (Datomiera) pauxilla* sp. n.**

Rather shining, head black : thorax dark reddish-brown, elytra brownish-yellow; abdomen black, the first two and the last segments brownish-yellow. Antennae reddish; the first two segments and legs reddish-yellow. Length 1.5 mm.

Size and build of *sordidula* Er. but much more shining, differently coloured and not roughly punctured. Head suborbicular, narrower than the thorax, the eye about as long as the post-ocular region, the puncturation extremely fine, rather sparing, the ground sculpture rather feeble. Antennae as in *sordidula* except that the last segment is shorter. Thorax transverse (2.5 : 2), the puncturation closer and not so fine as on the head, the ground sculpture weak. Elytra broader and a little longer (2.5 : 2) than the thorax, transverse (3.4 : 2.5), very finely and much more closely punctured; ground sculpture absent. Abdomen very finely, moderately closely punctured on the first two segments, much more sparingly on the posterior, the ground sculpture fine and transverse.

♂ : 8th tergite with rounded and feebly crenulate posterior margin : 6th sternite a little produced, narrowed and rounded.

DEHRA DUN : Chakrata district. Bodyar, altitude 8300 feet. In dung. Type in my collection.

***Atheta (Datomicra) pseudosordidula* sp. n.**

Size, colour and lustre of *pauxilla* Cam., differs in the much less fine, closer and rougher puncturation of the head and thorax, that of the elytra and abdomen, however, scarcely differing from that species but the former are shorter only as long as the thorax, which is feebly sulcate along the middle. The antennae are dark reddish-brown in colour and constructed as in *sordidula* Er., the last segment being oblong and longer than the two preceding together.

No secondary sexual characters visible.

DEHRA DUN : Lachiwala, Keyarkuli. Type in my collection.

***Atheta (Acrotona) ghanil* sp. n.**

Shining; head and abdomen black, the last tergite yellow; thorax bright reddish-yellow; elytra yellow with the scutellary region triangularly infusate. Antennae black, the first two segments and legs reddish-yellow. Length 2.5 mm.

Size and build of *fungi* Gr. but differing in the colour, the penultimate segments of the antennae slightly more transverse, the sculpture of head, thorax and abdomen scarcely differs from that species, but that of the elytra is rather finer, the ground sculpture is similar.

PUNJAB : Lyallpur, 13.xii.39 (*M. A. Ghani*). Under dead leaves. Eight specimens. Type in the British Museum (N.H.).

***Atheta (Acrotona) orphanella* sp. n.**

Rather shining, black, the elytra dark brown, the posterior margins of the last two tergites obscurely rufescent. Antennae black, the first two segments yellowish-brown. Legs reddish-yellow. Length 2 mm.

In colour and lustre much like *orphana* Er. but much narrower, the antennae much thinner, the puncturation of the head and especially the thorax much rougher, the abdomen less closely punctured. Head rather broad but narrower than the thorax, finely, moderately closely asperately punctured; ground sculpture feeble. Antennae slender, the 3rd segment a little shorter than the 2nd, 4th about as long as broad, 5th to 10th transverse, increasing in width, the penultimate twice as broad as long, 11th as long as the 9th and 10th together. Thorax transverse (2.75 : 2), the sides evenly rounded, a little retracted in front, the sculpture fine, close and granular, the ground sculpture scarcely visible. Elytra longer (3 : 2) and broader than the thorax, not emarginate postero-externally, with fine close asperate puncturation much like that of *orphana* and with fine ground sculpture. Abdomen nar-

rowed towards apex, finely and much less closely punctured than in that species; ground sculpture fine and transverse. Middle and posterior tibiae without setae.

KASHMIR : Gulmarg. Unique. My collection.

***Atheta (Acrotona) rufolucida* sp. n.**

Shining yellowish-red, the head darker, the abdomen with the 3rd and 4th visible tergites slightly infuscate. Antennae and legs reddish-yellow. Length 1.75 mm.

In size and build scarcely differing from *orphana* Er. but more shining, differently coloured, more sparingly punctured and with shorter antennae. Head very finely, sparingly punctured. Antennae a little shorter than in *orphana*, the intermediate segments shorter, otherwise similar. Thorax with fine, moderately close asperate punctures, transverse (3.5 : 2.5), the sides evenly rounded. Elytra longer (3 : 2.5) and broader than the thorax, more deeply emarginate postero-externally than in *orphana*, the punctures less fine and closer than on the thorax. Abdomen with the first four visible tergites each with three transverse rows of fine punctures, the last two sparingly and irregularly punctured. The whole insect without ground sculpture, the pubescence fine and yellow, on the fore parts semi-erect.

Nilgiri Hills (*H. L. Andrewes*). Type in my collection.

***Thamiaraea adjacens* sp. n.**

Very near ♀ *dimorpha* Cam. and with similar antennae and colour except the thorax, which is reddish-brown, the fore parts, however, are as closely but much less finely and distinctly roughly punctured, the abdomen more closely punctured; the ground sculpture of the fore parts is not quite so marked whilst that of the abdomen is distinct, whereas in *dimorpha* it is scarcely visible. Length 4 mm.

♂ : unknown.

DARJEELING : Ghum district. Tiger Hill, alt. 8500–10,000 feet. Unique. My collection.

***Thamiaraea inconspicua* sp. n.**

Moderately shining : head, thorax and abdomen black, elytra yellowish-brown. Antennae black, the first three segments and legs reddish-yellow. Length 3 mm.

Near *submontana* Cam., but of darker colour, antennae longer, the intermediate segments as long as broad, the penultimate scarcely transverse, 11th as long as the 9th and 10th together; head narrower, the punctures less fine and closer, the ground sculpture weaker; thorax less transverse, the punctures finer, the ground sculpture less distinct; elytra more finely punctured and with scarcely visible ground sculpture : abdomen with puncturation much as in *submontana* but with much less distinct ground sculpture.

♂ : unknown.

DEHRA DUN. Unique. My collection.

***Thamiaraea parvula* sp. n.**

Moderately shining, black, the elytra yellowish-brown, the posterior margins of the tergites narrowly rufescent. Antennae reddish, the first two or three segments and legs reddish-yellow. Length 2 mm.

The smallest Indian species. Head suborbicular, narrower than the thorax, the eyes rather large, very finely, rather sparingly punctured, finely coriaceous. Antennae short, the 4th segment as long as broad, the 5th to 10th gradually more transverse, the penultimate twice as broad as long, the 11th as long as the 9th and 10th together. Thorax trans-

verse (3.5 : 3), the sides rounded in front, straight and slightly retracted behind, the puncturation and ground sculpture as on the head. Elytra longer (3.75 : 3) and broader than the thorax, less finely, more closely, roughly punctured, the ground sculpture coriaceous. Abdomen very finely, sparingly punctured, the ground sculpture fine and transverse.

♂ : unknown.

SIMLA HILLS : Kotgarh. Unique. My collection.

Zyras (Glossacantha) *deceptivus* sp. n.

Very near *obscurus* F. but differing as follows. ♂ : head slightly impressed on the middle of the disc, shining and only feebly coriaceous like the rest of the surface; antennae less stout, the penultimate segments less transverse; thorax shorter, more transverse (4 : 3), much more finely punctured and with feeble ground sculpture; elytra more finely punctured and with a fine but distinct ground sculpture; abdomen more finely, much more sparingly punctured, practically impunctate behind; processes of the 3rd tergite much shorter, 7th with a fine sharp keel along the middle, the keel on the 8th less developed. In all other respects like *obscurus*. Length 6 mm.

DEHRA DUN. Unique. In my collection.

Zyras (s.str.) *indicus* sp. n.

Colour and lustre of *geminus* Kr. and similar in build except that the thorax is a little longer, as long as broad and also differs as follows : the antennae are shorter and stouter, the intermediate segments as long as broad, the penultimate transverse, only the first two and a half and the last two reddish-yellow; the sculpture of the head scarcely differs in the two species but the thorax is much more finely and much more sparingly punctured and without trace of a median ridge; the puncturation of the elytra is about as close as in *geminus* but finer and asperate; the 4th and 5th visible tergites are rather less punctured than in that species : the long stiff pubescence scarcely differs. Length 5.5 mm.

MYSORE : Anantapur (*E. A. Glennie*), 17.x.33. Unique. In my collection.

Zyras (s.str.) *nitens* sp. n.

Shining, the fore parts black, the elytra with the disc obscurely reddish; abdomen dark reddish-brown, the raised lateral margins yellow-reddish. Antennae reddish, the first three segments and the last reddish-yellow. Legs yellow. Length 5 mm.

Build of *geminus* Kr. but larger and differently coloured, the antennae longer and more slender. Head almost impunctate, the eye as long as the post-ocular region. Antennae with the 3rd segment a little longer than the 2nd, 4th to 9th all longer than broad, decreasing in length, 10th as long as broad, 11th as long as the 9th and 10th together. Thorax slightly transverse (3.5 : 3), the sides sinuately retracted behind, before the scutellum with a deep fossa, the punctures small, few in number and scattered; the sides with five long black setae. Elytra as long as but broader than the thorax, rather coarsely and rugosely punctured in the scutellary region, more finely and much less closely elsewhere, the sides with four long black setae. Abdomen a little narrowed at the base and apex, practically impunctate and with long black setae at the sides and apex. The whole insect without ground sculpture.

SELANGOR : The Gap. Unique. In my collection.

NEW SPECIES AND FORMS OF *TENARIS* (LEP. AMATHUSIIDAE)

By C. Joslin Brooks, F.R.I.C., F.R.E.S.

THE numerous and important collections acquired by the British Museum (Natural History), in recent years, include many hundreds of specimens of *Tenaris*, which I have been privileged to study. A number of new species and forms occur among them, which I describe below. Unfortunately, the revisionary study of the genus has had to be postponed, although much work has been done; at the present time I am only able to place these new forms on record.

I have followed Stichel's arrangement of the species, as published in Wytsman's *Gen. Insect.*, Fasc. 36, Nymph. Amathusiinae, as this appears to be more systematic than that adopted by Fruhstorfer in Seitz, *Macrolep.* 9. Full references can be obtained by consulting either of these works.

All the types of forms described below are in the British Museum (Natural History).

I desire to record my thanks to the Trustees of the British Museum for the opportunity to carry out this study, also to the members of the staff, and others who have kindly given me advice and assistance.

For conservation of space a few obvious abbreviations have been used in the descriptions, namely:—fw = fore-wing, hw = hind-wing, ups = upperside, uns = underside.

Tenaris horsfieldi Swainson.

***Tenaris horsfieldi* ab. *acosmeta* ab. nov.** ♂. Without ocelli on the upper and underside of the hw.

Habitat.—Soekaboemi, Java (*G. Overdijkinkt*). Ex Joicey coll.

This example of the total absence of ocelli is unique throughout the genus; for this reason I consider it worthy of special mention. Further, *horsfieldi* is subject to very little variation, and only a few examples of the ocellar aberration *opulenta* Stichel are noticeable in the long series of the various races.

Tenaris onolaus Kirsch.

Fruhstorfer, in his review of this species (Seitz, *Macrolep.* 9: 420), remarks that the type figured by Kirsch in his original description (1877, *Mitt. zool. Mus. Dresden.* 1: 122 t. 6. f. 7) and taken on an island in Geelvink Bay, closely resembles *saturator*, from British New Guinea, but that specimens from the mainland on the west of Geelvink Bay differ in the shape of the border on the hw ups from Kirsch's figure. The long series of *onolaus* in the British Museum show that the shape of this border is very constant in each race. It is therefore possible that the mainland form does not represent *onolaus onolaus* Kirsch. As this question is somewhat involved I have reserved its discussion for another occasion.

On the mountains at the south of Geelvink Bay a fine form occurs, which I have distinguished as :—

Tenaris onolaus form shapur f. n. ♂. Fw ups dark greyish-black, a narrow white border on the inner margin. Uns as above. Hw ups outer marginal border grey-black, broad, extending with little reduction in width to the ocellus, where it terminates; a black ocellus in a prominent orange area, wider than the border, extending inwardly with an irregular suffused margin, and not extending into the white anal area. Uns, a very dark border across the base and extending broadly on the anal fold, narrow on the costa, broad at the apex to include the ocellus, continued outwardly to below vein 3 to the deep orange-yellow area filling the lower third of the wing. Ocellus prominently black with white pupil.

♀. Like the ♂, but without the white border on the fw.

The features distinguishing this form are the large size, the dark colour, and extended deep orange area above and below.

Habitat.—Weyland and Wandamman Mts (Types, ♂ and ♀, Wandamman Mts) (*Pratt Bros.*), Nov. 1914, 7 ♂, 6 ♀.

The specimens from the Weyland Mts are rather smaller.

Tenaris macrops Felder.

Tenaris macrops sura subsp. n. ♂. Fw ups and uns as *macrops*. Hw ups as *macrops*; uns broadly margined with brown, reducing the white area to a small patch in the discal area.

♀. Fw ups grey-brown, somewhat lighter internally, and nearly white on the inner and outer margins. Uns grey-brown on the costal margin, broadly at the apex, internally lighter. Hw ups wide grey-brown border from the apex to the ocellus, suffused inwardly, anal angle to the base white; uns as the ♂.

Habitat.—Geisser Is., near Ceram, ex coll. H. Druce 1913, 1 ♂, 1 ♀.

Tenaris macrops ♀-form **psola** f. n. Among the females of both *macrops* and *macropina* specimens occur with the grey-brown margin of the fore-wing wide at the apex and suffusing inwardly on the veins nearly or quite to the cell; in some specimens of *macrops* the wing is completely filled, the white area of the wing has a soiled appearance, otherwise they are normal.

Type, ♀, Moluques, Batjan, *W. Doherty*, août 1897 (in Oberthur coll.).

Tenaris elatus sp. n.

♂. Fw ups blackish-brown on the costal margin and apex to vein 4, filling the costal half of the cell, extending outwardly to vein 2, below which is a white area somewhat tinged with brown; all veins darkly outlined, both in the dark and white areas. Uns as above, but the white area free from any tinge of colour. Hw ups, the costal area from the base to vein 5 greyish-brown, at the apex and outwardly broadly brown, extending to nearly the width of the yellow ring of the anal ocellus and around which it partly extends internally as a ring, broken on the anal side; the band suddenly narrows below the ocellus, continuing as an edging to the tornus and anal fold. The black anal ocellus prominent with a white pupil and wide yellow ring. The brown scales below the hair streak on the anal fold are not prominent. Uns as above, but the costal band wider at the base. The black ocelli, with white pupil, large, that at the anal angle much larger than on the upperside, with narrower yellow ring.

♀. Fw ups, the black-brown costal band extending widely across the apex to below vein

3 outwardly, but not into cell, otherwise pure white. Uns as above, but the basal half of the cell filled with dark brown. Hw ups as the ♂, but the black ocellus smaller. Uns as in the ♂, but outer border extending irregularly beyond the anal ocellus, leaving it nearly free. The ocelli with well-defined yellow and brown rings.

Habitat.—Karkar, Dampier Is., Feb. 1914. Ex Joicey coll., 2 ♂, 1 ♀.

This is an interesting insect. The wing shape is that of *catops*; also the dark outlining of the veins and the extended white of the female indicate this species, but the prominent and well-developed ocelli, especially on the upperside, recall *macrops* and *phorcas*, with both of which there are resemblances, so that it is difficult to assign it to either of these species.

Tenaris catops Westwood.

Tenaris catops leanas subsp. n. ♂. Fw ups, the grey-black-brown band below the costal margin slightly enters the cell then continues below vein 7 to broadly fill the apex as far as vein 4; from the cell the veins 4, 5 and 6 are more or less outlined, with white spaces between. Uns, the costal band from the base following vein 6 broadening to fill the apex, tapering on the outer margin to below vein 4. Hw ups, the dark grey area at the apex broad, tapering on the outer margin to terminate at vein 3, the basal area yellow; uns, the costal band from the base extending inwardly to vein 7, broadly across the apex, to include the ocellus, then tapering to vein 3.

♀. As *westwoodi*, but with a yellow area at the base of the hind-wing.

Habitat.—Milne Bay, S.E. New Guinea. Type ♂ and ♀.

A distinct race which appears to have escaped notice. It approaches *westwoodi* but is at once distinguished by the yellow area at the base of the hind-wing, thus showing its relationship to the South Coast races.

Tenaris catops form pellus f. n. A few melanotic forms appear in both sexes, in the *kajuna* and *catops* series. The fw is normal, while the hw is very broadly dark, and on the uns the marginal band extends to the tornus enclosing the ocellus.

Type, ♂, Aru Is., Mar.—May 1916, *W. J. C. Frost*.

Tenaris rothschildi H. G. Smith.

Tenaris rothschildi form laius f. n. ♂. Fw ups, a narrow greyish-brown band on the costa, broadening across the apex, the band on the inner margin extending across the cell and not above vein 3. Uns, the white area prominent, the narrow grey band on the costa broadening at the apex, internally concave, continued somewhat outwardly; the band on the inner margin nearly filling the cell, not extending above vein 2. Hw ups grey-brown, extending from the outer margin to vein 2, below which the white area is limited by a narrow border on the anal fold. Uns, the brown area around the base extending on the costa, tapering to the ocellus, broad at the apex, tapering to the anal ocellus, below which it passes to terminate in a diffused area at the tornus; anal fold brown.

Habitat.—The coast from Geelvink Bay to Humboldt Bay, Dutch New Guinea, ♂.

This form is near *pelagia* Fruhst. but differs in the darker uns. To add another form to the large number already described is somewhat regrettable, especially as they are not very definite, but as this form does not agree with the others its description appears to be justified.

Tenaris chionides Godman & Salvin.

Tenaris chionides form *superarvana* f. n. Among the magnificent white forms of *chionides* from British New Guinea are two females from the Hydrographer Mts, 2500 ft. (*Eichhorn Bros.*), that are near the form *arvana* Fruhstorfer, but the band across the inner margin of the fw is deep grey-black reaching vein 3 and almost filling the cell. On the hw the marginal border at the apex is narrower than in *arvana* and tapers to terminate midway on the outer margin.

Type, ♀, Hydrographer Mts, Brit. N. Guinea, 2500 ft., Jan.-May, 1918.

Tenaris acontius sp. n.

♂. Fw ups, the yellowish-brown costal border not extending below the sub-costal, widening at the apex to vein 7, across the internal margin a wide greyish-black band extending to vein 3 and across the cell, leaving a pure white space between the borders. Uns, the costal band as above but widening at the apex to nearly reach vein 6, the grey-black band on the inner margin extending across the cell to beyond vein 2 outwardly, the veins in the white area clearly outlined. Hw ups, the greyish-black border on the inner margin suffused internally, widening at the apex to include the ocellus, faintly visible, extending on the outer margin to the width of the faintly visible anal ocellus below which it narrows to the tornus, continued narrowly on the fold to the base. Uns, a well-defined black-brown area on the costal margin following vein 7, widening at the apex to half the width of the ocellus, below which it rapidly narrows to a thin border extending to the base. Ocelli well developed with conspicuous white pupil and wide yellow ring.

♀. Fw ups, the grey-brown bands as in the ♂, but slightly more extended at the apex, and on the inner margin filling the cell. Uns as in the ♂. Hw ups, the grey-brown band as on the ♂, but only half the width; uns as in the ♂, but the colour greyish-brown, and the ocelli smaller.

Habitat.—Wangaar, S. Geelvink Bay, Dutch New Guinea (*C. F. & J. Pratt*). Ex Joicey coll., 2 ♂, 1 ♀ (including Types).

This species appears to be a form uniting *rothschildi* and *cyclops*, the dark greyish-black band across the fw not filling the cell indicates the former, while the wing shape is that of *cyclops*. The dark scales below the anal hair streak are not prominent as they are in *rothschildi* but resemble the reduced form of *cyclops*. The dark scales on the gland at the costa are present.

Tenaris acontius form *theon* f. n. ♂. Fw ups similar to *acontius*, the narrow faintly yellowish costal band widening at the apex to reach vein 6 on the outer margin, the band across the inner margin nearly filling the cell and extending outwardly to beyond vein 3, the inner space being a soiled white on which the veins are indicated. Uns, the white area much reduced and only showing as white streaks between the prominently outlined veins 3, 4, 5 and 6, not extending to the outer margin, and not more than the width of the cell towards the costa. Hw ups, as *acontius*, but the white area suffused with grey; uns as *acontius*, but the dark area at the base more extended.

Habitat.—Uty Riv., North New Guinea (*Pratt Bros.*). Ex Joicey coll., 1 ♂ (Type).

The locality data of this specimen are as given above, but I have been unable to trace a "Uty River," unless it is the R. Uta in S.W. Dutch New Guinea. A male from the Weyland Mts resembles *theon*; it is much smaller and also an unusual aberration, probably due to some injury received during the pupal stage:

Tenaris myops Felder.

Tenaris myops fergussonia form **crus** f. n. ♂. Fw ups, the normal white area is absent, but is indicated by a somewhat lighter grey-brown between the veins. Hw ups from vein 2 outwardly grey-brown, deepening towards the margin, between vein 2 and the anal margin white. Uns as *fergussonia*.

Habitat.—Fergusson Island, 2 ♂.

Tenaris mailua H. G. Smith.

Tenaris mailua dionus subsp. n. ♀. Fw ups similar to *mailua*, but the white area wider, and the apex not extending so far outwardly; marginal borders dark grey. Uns as above. Hw ups, the dark grey costal and outer margin extending to the tornus nearly as wide as the ocellus, continued to the base as a narrow edging, from the base to the tornus between vein 2 and the anal margin tinted yellow; the ocellus as a black iris with indications of a suffused yellow ring, but variable, it may have a wide yellow surround or be little more than a black spot in a yellow area; uns costal border wide at the base, tapering to edge before the ocellus, then continuing to the base as above, between vein 2 and the anal margin prominently yellow. The apical ocellus complete with a broad brown ring, while that at the anal angle has a wide orange ring partly enclosed outwardly by a brown margin, and on the inner side may or may not suffuse into the yellow area. The specimens are smaller than *mailua*.

Habitat.—Ekeikei, British New Guinea, 1000 ft., 4 ♀ (the ♂ is unknown).

Tenaris artemis Vollenhoven.

Tenaris artemis pedius subsp. n. ♂. Fw both above and below similar to *artemis*, but a distinctly greyer brown. Hw ups from vein 2 outwardly filled with grey-brown, lighter above the median, darkening towards the border, continued from vein 2 as a narrow edging to the base leaving a greyish-white area extending down the anal fold; below the base a streak of light yellow hairs. Anal ocellus of medium size with yellow and brown rings; from some specimens the ocellus is absent. Uns, the costal band broad from the base to the ocellus, dark brown, continued outwardly to the anal angle, about half the width of the ocellus, suffused inwardly, leaving a brownish-white area with a yellow tinged zone below the base. Ocelli fully developed.

♀. Fw ups similar to the ♂, more greyish-brown than *artemis* and with narrower white area. Uns, the white area more extended than above, also the dark markings lighter and with a reddish tinge. Hw ups similar to the ♂; uns, the costal band tapering from the base to nearly terminate before the ocellus and somewhat diffused, the outer border dark on the margin suffused internally to less than half the width of the ocellus, continued as a narrow edging from the tornus to the base, containing a reddish-white area; slightly yellow below the base. Ocelli as the ♂.

Tenaris artemis pedius ♀-form **helice** f. n. Fw ups, the white area restricted, not reaching the outer margin; uns as above. Hw ups filled with dark brown, somewhat lighter in the disc, a dusky white zone above the anal fold; uns, the costal band expands around the base, suffused outwardly, the outer border more sharply defined than on the ♂, and the discal area white. The anal ocellus appears on the ups as a dark pupil with indication of a yellow ring; below, both ocelli are well developed.

Habitat.—Gebi Island (*Waterstradt*), 1903. Ex coll. Oberthur, 20 ♂, 6 ♀.

In the series no male occurs agreeing with this female, but a second ♀-form also appears among other races of *artemis* from the west, although not recognised as such. Fruhstorfer describes *timesides* and *clusina* under *grisela* and

artemis, respectively, without stating the sex; these are well represented in the British Museum series with no corresponding males. The characteristic which distinguishes the second form from what may be considered the normal is the shape of the costal border on the hw uns. In the normal form this passes to the base of the wing, where it terminates without expanding. On the ups there is generally a streak of yellow below the base. The second form has the band expanded round the base extending into the wing and prolonged on the anal margin; above there is no yellow below the base.

T. a. staudingeri Honrath. The type of this subspecies was assumed to be represented by a female in the Adams collection which was figured. I have now been able to establish the male type, which I found among Honrath's specimens in this collection; it bears a small label "*staudingeri*", and had apparently been overlooked.

T. a. onesimus Butler (= *sticheli* Fruhstorfer). When examining the types of *dioptrica* it was found that *onesimus* does not belong to this species, but to *artemis* subsp. *sticheli*, with priority of description (Butler, *Proc. zool. Soc.* 1877: 468; Fruhstorfer, 1901, *Ins-Borse.* 18: 375). Fruhstorfer states in his review of *dioptrica* (*Macrolep.* 9: 422) that the form is somewhat doubtful, also the country of origin. This is incorrect. Although the type is somewhat rubbed the relationship is clearly indicated, and it bears a label "Port Moresby. McFarlane."

Tenaris artemis zetes subsp. n. ♂. Fw ups narrowly light grey-brown along the costa expanding across the apex to vein 7, at the base below the cell pale yellow, from vein 3 to the tornus a suffused light brown, darker outwardly, the white area somewhat dusky. Uns costal margin and apex as above, but dark brown, lower half of the cell and across the wing, below vein 3, lightly suffused brown. Hw ups, the outer third suffused grey-brown, darkening towards the margin and terminating at the ocellus, darkly edged from the tornus to the base, yellow below the base, and between veins 1 and 2 with buff hairs, the anal ocellus prominent with dull yellow ring; uns, dark brown costal band narrowly to the ocellus, continued outwardly tapering to the anal ocellus and nearly as wide as the ocellus at the apex, suffused inwardly, then continued as a brown edging to the base; the lower ocellus stands free on the white ground, a yellow suffusion below the base, ocelli well developed.

♀. As the ♂, but lighter below.

Habitat.—Murry Is., Gulf of Papua, 1 ♂ and ♀.

Approaches *jamesi*, but with differences worthy of recognition.

T. a. intermedians Hulstaert (= ♂ *T. meeki* Rothschild). Lord Rothschild's description of *meeki* (1916, *Nov. Zool.* 23: 305, Pl. 2 f. 3, 7) is accompanied by the illustrations of both sexes. Four males from the Snow Mts, Otakwa R., which the British Museum possesses, are undoubtedly this insect; also they agree with Hulstaert's description of *intermedians* from Torai (1925, *Ann. Mag. nat. Hist.* (9) 15: 444). In the absence of the type of the latter they must be accepted as this insect and take priority of *meeki*. Although Rothschild separates them from *artemis*, on somewhat slender differences, there can be no question but that they represent the form of this species occurring in the mid-south. Associated with the males are two females, also from Otakwa, which undoubtedly represent the opposite sex, and agree with the description of the female of *intermedians*, but are quite different from the illustration of the female *meeki*, which appears to belong to another species. The darker border of the hw uns is unlike *artemis* and characteristic of *dioptrica* and *hypobolus*, but as neither of these species has the yellow basal area and prominent ocellus, it may be assumed that its male is still unknown, or that it is a second ♀-form.

***Tenaris madu* sp. n.**

♂. Fw ups light brown on the costa to vein 7, extending into the cell, expanding to fill the apex with black-brown, continued outwardly tapering to vein 3 where it joins the inner marginal band extending across the wing and filling the lower half of the cell; below the base and for about half the length of the wing as far as vein 1 light brown, on some specimens almost white. The white area below the apex rounded, the veins intruding with a suffused outline; uns as above but somewhat darker. Hw ups, the costal and outer marginal band broadly greyish-brown to the width of the ocellus, suffused inwardly, continued narrowly from below the ocellus to the base, a yellow area below the median, anal and secondary hair streaks fulvous. The anal ocellus with yellow and brown rings. Uns, the costal band prominent and darker than above, tapering somewhat to the ocellus, continued outwardly, wide at the ocelli but about half their width between them, from the tornus to the base as a dark edging. Ocelli prominent, with full yellow and brown rings.

♀. Fw ups and uns as the ♂, but no light area on the inner margin. Hw ups as the ♂, but the marginal border more sharply defined inwardly; uns, a light suffusion at the tornus and narrow edging to the base, otherwise as the ♂.

Habitat.—Biak, Schouten Is., North New Guinea, June 1914 (A. C. & F. Pratt), 15 ♂, 8 ♀.

In the absence of black scales under the hair streak on the anal fold of the hw, this species appears to be allied to *artemis*.

The scales on the costal gland on the hw are light, but when viewed obliquely the deep gland casts a shadow, giving the appearance of being black.

The anal ocellus on both sexes varies in size, and the species appears to be very subject to ocellar aberrations, varying from *lacrimans* to *prodiga*.

It is named in memory of a small Krokong dyak, who, from his exceptional intelligence, ability to meet emergencies, and knowledge of the jungle, was selected to accompany me on numerous jungle excursions, and also by Messrs. Hewitt and Moulton, late Curators of the Sarawak Museum, when on similar expeditions.

***Tenaris dimona* Hewitson.**

Throughout the subspecies of *dimona* a double or single anal ocellus is of common occurrence. This duplication is the only distinction between *dimona* and *desdemonia* Staudinger, hence the latter name can only be regarded as a synonym, or used to distinguish the form with a single ocellus. That Hewitson's type originated from Ceram and was taken by Wallace is proved by the small circular label he used, attached to the pin, and marked "E. Ceram". Hewitson's error, in his description, in attributing the specimen to Aru, is probably the reason for the Aru race being still nameless.

***Tenaris dimona aruensis* subsp. n.** ♂. Fw ups and uns similar to *dimona*. Hw ups, the dark border at the tornus not extending into the wing beyond the black of the underside ocellus when viewed by transmitted light, the anal ocellus indicated by a somewhat dark zone, scattered blue scales and lighter pupil, the second ocellus faintly indicated. Uns, both apical and anal ocelli fully developed, the brown ring of the anal ocellus extending to the tornus and continuing narrowly to the base where it expands slightly, the space between the apical and lower ocelli filled with lightly suffused brown, darkening on the margin, a prominent orange area between vein 2 and the anal fold.

♀. Fw ups dull grey-brown filling the basal half of the cell, continued on the costal margin, extending across the apex, and outwardly to the tornus, diffused inwardly. Uns as above but not on the outer margin after vein 4. Hw ups, grey-brown margin from the

apex to the tornus, as wide as the ocelli, tapering at the anal angle to a narrow margin to the base, faded yellow below the base, the anal ocellus only indicated by a dark zone with an inconspicuous white centre. Uns as the ♂.

♂ type, Aru Is.; Ureinning (C. Ribbe), 1884. ♀ type, Aru Is. (Wallace), 6 ♂, 2 ♀.

These specimens are smaller than *dimona*, which race also occurs on the Aru Islands.

Tenaris dimona didorus subsp. n. Resembles *affaka*, but on the fw the costal band above and below is more extended and less defined internally, the white area of both wings is less than in *kapura*. The very large ocelli on the uns distinguish this race from the other subspecies.

Habitat.—Mysol, Oct.–Nov. 1916, wet season, foothills 100–500 ft., W. J. C. Frost, 6 ♂, 2 ♀, including Types.

Tenaris gorgo Kirsch.

Tenaris gorgo lucina subsp. n. ♀. Fw ups white, a narrow black costal band broadening to cover the apex, but not deeply. Uns as above. Hw ups, the costal margin and outwardly black, rapidly suffusing inwardly to cover about half the wing, leaving a white to yellow area in the disc, light yellow hairs below the base. Uns, costal border narrow, tapering to nearly terminate at the apical ocellus, from the apex outwardly a narrow black marginal band, lightly suffused internally, continuing from the tornus to the base as a black edging, an orange-yellow streak below the base. The ocelli small, complete.

Habitat.—Otakwa R., Snow Mts, New Guinea, 3500 ft. (Meek), 2 ♀.

Tenaris gorgo thyia subsp. n. ♀. Fw ups as in *lucina*, but the dark apex wider, also below. Hw ups, the outer border narrow and less suffused, not extending to the base. Uns very narrow black edging, otherwise as *lucina*.

Habitat.—Aroa River, New Guinea, ♂♀.

The difference between these two forms is slight, but as is shown by the two specimens from each locality, together with the great distance which intervenes, it seems probable that they are different races, a view that can only be substantiated when the males are discovered.

NEW SPECIES OF ETHIOPIAN *SIMULIUM* (DIPTERA)

By Botha DE MEILLON, F.R.E.S.

The South African Institute for Medical Research, Johannesburg.

THE species described below were collected by Mr. J. J. C. Buckley in the Lumbwa district of Kenya. The types of the species are in the collection of the South African Institute for Medical Research, Johannesburg.

Simulium lumbwanus sp. n.

Female. A medium to large insect; black except for golden brassy pubescence on the mesonotum laterally and on the basal segments of the abdomen. *Head*: vertex with golden pubescence, clypeus apparently dark but rubbed in most specimens. *Mesonotum*: with a very broad median band of black pubescence bordered on each side by a lateral band of dense golden scales. This ornamentation is very striking and visible from all angles in all lights. *Pleurae* black with greyish reflections in some lights; no post-spiracular scales. *Wings*: length 3 mm.; base of radius and subcosta provided with setae; patch of hairs at the base of the radius jet black. Halteres with strikingly reddish-yellow crowns. *Legs*: jet black unrelieved by any pale pubescence; claws toothed. *Abdomen*: largely black; dorsally segment I with an apical fringe of golden scales, laterally with longish dark hairs; II densely and evenly clothed with golden scales; III and IV dorsally black, laterally with rather scattered yellowish scales; V, VI and VII shiny black dorsally, laterally as in III and IV. The golden scaling on segment II contrasts very vividly with the otherwise black abdomen when viewed dorsally.

This description is a composite one made from over 40 females taken in a light trap and two taken biting. They are all somewhat rubbed.

Male. Like the female; mesonotum with golden scales laterally, on the shoulders and prescutellar area; the median black scaled area therefore not in the form of a well-defined band as in the female. Segments V and VI of the abdomen with a silvery patch laterally; segment II as in the female; terminal segments shiny. *Terminalia* (fig. 1, *a, b, c*): side pieces rather narrow in ventral view, broadly expanded basally; claspers short, broad basally with apex suddenly narrowed to a point bearing a single tooth, somewhat as in *adersi* Pomeroy. Aedeagus broad in ventral view, each lateral apical corner produced leaving a median notch in which the median keel is visible. Side view of aedeagus as in the figure. Parameral hook consists of a single strip of chitin.

Pupa. Unknown.

In external ornamentation this species is very easily distinguished from all other Ethiopian *SIMULIIDAE*. It belongs to a large group of species in which the abdominal pubescence is more concentrated basally, the claws toothed and the post-spiracular area bare. It differs from all the members of this group in the uniformly dark legs and the striking ornamentation of the mesonotum. The male terminalia resemble those of *adersi* Pom. in some respects but specific differences are obvious if not easily described.

Type: male, trapped Kipsonoi River, Ngoina, 8.ii.43; 41 females trapped same locality October 1942 and two caught biting, Yala River, Kaimosi, May 1943.

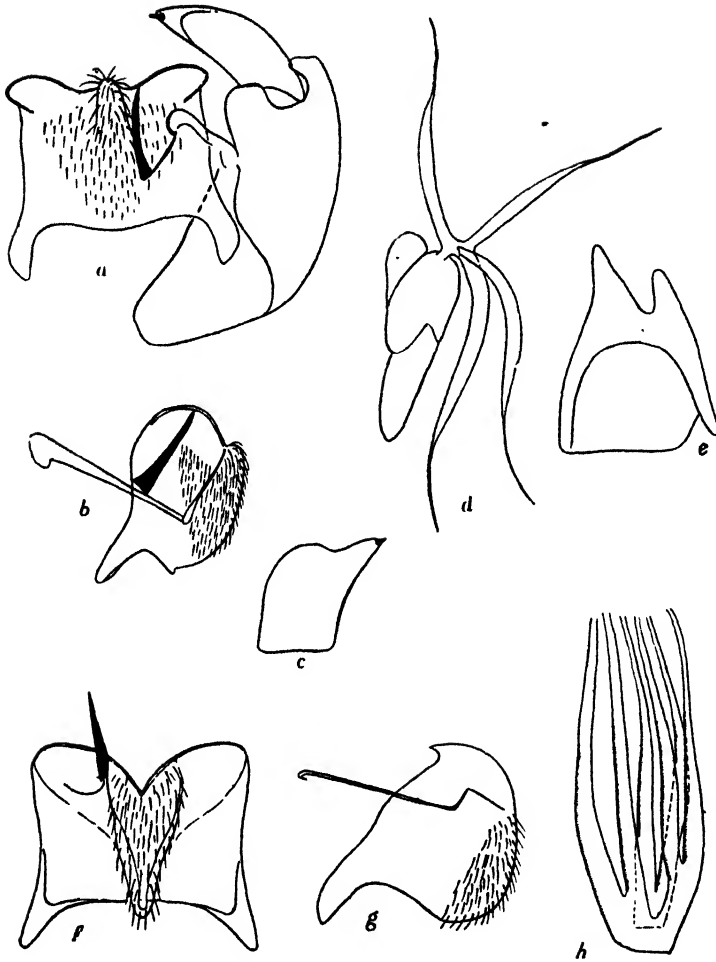


FIG. 1, *a-h*.—*Simulium lumbwanus* sp. n., *a*, aedeagus, side piece and clasper in ventral view; *b*, aedeagus in side view; *c*, clasper. *Simulium buckleyi* sp. n., *d*, pupa and respiratory organ; *e*, internal view of the side piece; *f*, ventral view of the aedeagus; *g*, side view of the aedeagus. *Simulium hirsutum* var. *sexiens* var. n.; *h*, base of the respiratory organ of the pupa.

***Simulium buckleyi* sp. n.**

Female. A medium-sized species with pale golden pubescence and legs generally resembling those of *nigritarsis* Coq. *Head*: vertex and clypeus with pale golden pubescence. *Mesonotum*: uniformly and densely clothed with pale golden scales, no silvery ones evident; scutellum similar and in addition some long yellow hairs; sternopleuron dark with the usual greyish reflections in some lights, rest of pleura mainly violet; no post-spiracular scales. *Wings*: base of the radius hairy and patch of hairs at the base largely pale;

halteres pale yellow. *Legs*: all tarsi jet black: femora with approximately apical third or less black, rest lemon yellow with yellowish scaling; tibiae with approximately basal halves yellow with pale scaling, rest black with dark scaling. Claws toothed. *Abdomen*: dorsally evenly and densely clothed with yellowish scales.

Male. Much darker than female. Mesonotal scaling more brassy. Legs with the pale areas much reduced; 1st hind tarsus greatly enlarged. Abdomen evenly and densely clothed with rather darker scales than in female. Long hairs of the 1st abdominal segment dark. *Terminalia* (fig. 1, *d, e, f, g*): side pieces rather short, broad basally in internal view; claspers short, gradually tapering, with a single terminal spine; aedeagus broad in ventral view, deeply notched apically; side view as in illustration. Parameral hook of a single long pointed tooth.

Pupa. Respiratory organ of four large sharply pointed filaments, all of these longer than the pupa itself. The nature of the branching and shape of the filaments is best appreciated from the illustration.

Type: male, Chemagel River, Ngoina, August 1941. 3 ♀, 2 ♂ same locality and date, also 2 ♂ Chagaror River, Ngoina, November 1941. All these with their associated pelts.

The female belongs to a small group of species which have toothed claws, the post-spiracular area bare and the abdomen densely and evenly clothed with pale scales. Of this group it resembles *nigritarsis* Coq. most closely, differing only externally in the absence of silvery pubescence from the mesonotum. The male terminalia and pupal respiratory organ are unique and quite unlike those of any other known Ethiopian *Simulium*.

***Simulium hirsutum* var. *sexiens* var. n.**

This variety differs from *hirsutum* Pomeroy only in the number of branches of the pupal respiratory organ (fig. 1, *h*). In var. *sexiens* the filaments are six in number; all arise more or less from a common base and there is no secondary branching. The outer wall is provided with small nodules as in *hirsutum*.

The male terminalia and other characters agree with those of *hirsutum*.

Type: pupal pelt, Kipboga River, Ngoina, November 1941. The male which hatched from this pelt together with several other adults and their associated pelts from the same locality and date.

SOME PARASITIC BEES FROM CYPRUS (HYMENOPTERA, APOIDEA)

By Vladimir B. Popov.

THE following Cyprus bees were collected and kindly sent to me by Mr. G. A. Mavromoustakis, Limassol, Cyprus. The types of the new species are in the collection of the Zoological Institute, Academy of Sciences, Leningrad, and the paratypes in Mr. Mavromoustakis' own collection.

Stelis (Protostelis) signata eremica Alfken.

Alfken, 1938, *Deutsch. ent. Z.* **1938**: 430, ♀.

Limassol, 23.vi.30 (1 ♀), 7.vii.28 (1 ♂), 17.vii.28 (1 ♀), 18.vii.27 (1 ♀, at *Statice*), vii.35 (1 ♀, 1 ♂), 6.viii.24 (1 ♀, at *Statice*), 24.viii.38 (1 ♂), 2.ix.27 (1 ♀), 5.ix.27 (1 ♂), 10.ix.38 (1 ♂), 11.ix.38 (2 ♂), 12.ix.38 (2 ♂), 13.ix.38 (1 ♂), 24.ix.38 (1 ♀); Para Pedi, 27.v.29 (1 ♂), 16.viii.37 (2 ♂); Phinikaria, 29.iv.25 (2 ♂, at *Rubus*); Platres, 3500 ft., vi.37 (1 ♂); Stavronini, 2000 ft., v.37 (1 ♂).

♂. Length 5-6.5 mm. Like the female, except: as a rule, narrow yellow band on vertex strongly reduced; vertex entirely dark; upper margin of tergite II largely black as in tergite I; yellow bands of tergites I and II sometimes broadly interrupted; tergite VI with two large yellow spots; sometimes these spots joined together, or tergite VI entirely dark; tergite VII black or with yellow or yellowish apical margin.

Cyprus females agreed well with Alfken's description, and their identification is in no doubt; but some of the characters mentioned by Alfken as separating his race from subsp. *flavescens* Friese, are distinctly variable. The lateral yellow stripe on mesothorax may be small and rounded (1 ♀); sometimes tergite VI (2 ♀) and mandibles (1 ♀) have no yellow spots; sternites and hind half of tegulae of all Cyprus females dark brown, and the body size appears to be rather large, 5.5-6.5 mm.

The male of subsp. *eremica* Alfken appears to be darker than the female. This fact is of certain interest because the male of the typical form is paler than the female; the sexes of subsp. *flavescens* Friese have no great difference in colour. It has already been noted by Reinig (1935), that in humble bees the male retains the primitive coloration of the species, while the female tends to accept at first the new coloration. From this point of view the process of colour variation in *S. signata* Latr. and its subsp. *eremica* Alfken is quite different; subsp. *eremica* Alfken seems to be younger than the typical race. The geographical range of the last form lies northwards to the range of subsp. *flavescens* Friese; the extremely light colour of subsp. *eremica* Alfken may be connected with its geographical range, situated southwards from the range of subsp. *flavescens* Friese; the former seems to be rather younger than the latter.

Alfken considers subsp. *eremica* Alfken to be a probable parasite of *Anthidiellum strigatum humerale* Alfken, a race occurring in both Palestine and Cyprus; host's size (6 mm.) corresponds well with that of parasite, especially of Cyprus specimens. *A. strigatum humerale* Alfken is also the palest form of the species (Alfken 1936).

Stelis (Stelis) phaeoptera meridionalis Popov.

Limassol, 6.v.31 (1 ♀); Episcopi, 6 and 7.v.31 (1 ♀, 4 ♂, at *Marrubium*).

The Cyprus female similar and the male quite similar to the type specimens of subsp. *meridionalis* Popov. Cyprus females smaller; punctures of mesonotum sparser; distances between punctures equal to three-quarters of their diameter (those of subsp. *meridionalis* Popov nearly equal to a half of their diameters); apical margin of clypeus strongly emarginated; punctures of abdominal tergites smaller and sparser; distances between punctures equal about two of their diameters (in subsp. *meridionalis* Popov—only to one diameter); tergite VI regularly covered with small punctures; distances between punctures slightly shagreened and nearly equal to one of their diameters, and only laterally some of punctures joined together.

Among the specimens from Caucasus I have seen some females corresponding exactly to Cyprus ones; perhaps these specimens belong to another form slightly differentiated morphologically, but parasitising a different host species.

Dioxys cincta (Jur.).

Limassol, 20.iii.30 (2 ♀, 1 ♂), v.35 (1 ♀); Ayia Phyla, 24.iii.35 (2 ♂); north of Ayia Phyla, 24.iii.38 (1 ♂); Polemidia, 5.iv.35 (2 ♂).

H. Friese (1895) and J. Popov (1936) noted a great variation of the species in size, colour, puncturation of the body, and position of the second transverse cubital vein. Cyprus specimens varied greatly in size and colour; length of the females 5.5–8.0 mm. and that of the males—6.5–8.0 mm.; female tergite II nearly all black or marked with a large black spot medially; tergite I with a large black spot, sometimes this spot gradually enlarged laterally, band-like; one male with tergites I and II and partially III red; abdomen of another male entirely black and only tergite I with small lateral dark brown spots (ab. *friederikae* Mader.).

Dioxys cypriaca sp. n.

Limassol, v.1935 (6 ♀, 8 ♂); iv.1936 (1 ♀, 1 ♂)

♀. Length 6–7.5 mm. Head as broad as the thorax; clypeus large, moderately convex, about half as long as broad with rather straight apical margin; scape of antennae short, not reaching the median ocellus; second joint of flagellum nearly as long as their width at apex; third and fourth joints very wide, nearly three times as wide as long; fifth rather short, nearly as broad as three-quarters of their length; sixth to eleventh nearly quadrate; twelfth rounded, about one and a half times as long as broad; ocelli rather raised, ratio of the distance from the outer margin of lateral ocellus to the distance from the latter to the nearest point of the eye being 3 : 4; eyes rather broad, kidney-shaped, distinctly enlarged towards the base of mandibles; tempora rather narrow, about as broad as a half of median width of the eye; scutellum rounded, about two and a half times as broad as long, with two rather large, flat and triangular teeth laterally; postscutellum with short median tooth; tergite VI widely ellipsoidal, without lateral angles; sternite VI slightly longer.

Moderately shining; body covered with closely-set, large and flat punctures; punctures of clypeus somewhat smaller; first and second pairs of legs and tarsi of the third pair covered with small punctures, slightly shagreened.

Black; mandibles dark reddish; antennae, tegulae and abdomen red; flagellum of antennae and sometimes tergites V and VI dark red; wing veins pale reddish.

Hairs all white, narrowly squamiform, short and rather dense; hairs of face, vertex, dorsum and tergite I palc-ochraceous; tergites I–V with narrow apical bands of white short hairs.

♂. Length 6-7.5 mm. Similar to the female, except: clypeus distinctly convex, its apical margin largely rounded; abdomen oval, moderately elongated, slightly flattened; tergite VI very broad, rounded; sternite IV with rounded apical emargination medially; sternite VI with moderately projecting rectangular lateral lobes and deep oval median impression; sternites VII and VIII as in *D. rufipes* F. Mor.

Slightly shining; puncturation of body rather slender; apical margin of clypeus and apical margins of tergites unpunctured, shining.

Black; mandibles, antennae, tegulae and wing veins dark brown; abdomen red; segments V and VI dark; apical margins of tergites I-VI pale yellowish; calcaria and tarsi dark reddish, metatarsi sometimes black.

Hairs all white, rather short and sparse; hairs of notum pale golden; hairs of apical bands on tergites I-VI very narrow and sparse.

Differs from *D. modesta* Popov (Usbekistan), which it resembles in structure of the female abdominal segment VI, in coarse and equal punctures of the tergite VI, pale colour of abdomen and legs, and apical bands of abdominal tergites.

Rather similar to *D. limbifera* J. Pér., which occurs in N.W. Africa and was recently found in Palestine (Alfken 1938); the female may be easily distinguished by the large tergite V with nearly blunt apical margin, by the apical band of tergite V and pale reddish colour of abdomen, with sternites always pale and tergites V and VI sometimes dark brown.

The structure of male genitalia and sternites VII and VIII of *D. cypriaca* sp. n. are rather similar to those of *D. rufipes* F. Mor. from Usbekistan (Popov 1936, fig. 4), but differs as follows: dorsal half of basal ring strongly emarginated laterally; basal lobes of sagittae with lateral processes; apical half of sagittae large, its tooth lying nearly one-third towards the inner lateral margin; the species may be separated also by the colour of the abdomen and the puncturation of the thorax, as well as by the size of the body.

Pasites maculatus aschabadensis (Rad.).

Limassol, 23.vi.25 (1 ♀), 25.vi.25 (2 ♀), vi.30 (2 ♀, 1 ♂), 13.ix.38 (1 ♂).

The Cyprus specimens are quite similar to those from Middle Asia; females large, 7-9 mm., pale reddish; males smaller, 5-6.5 mm., darker.

It was previously noted (Popov 1932; Popov and Yasumatsu 1935) that var. *brunneus* Friese from Tangier is probably a synonym of subsp. *aschabadensis* Rad.; the ranges of the two forms are widely separated, but the Cyprus specimens now form an intermediate link. Cockerell (1910) mentioned the typical form from Cyprus, and Alfken (1935) noted var. *brunneus* Friese from North Iran; these specimens undoubtedly belong to subsp. *aschabadensis* Rad.

Ammobates mavromoustakisi sp. n.

Limassol, vi.31 (6 ♀); 25.vi.25 (1 ♂); Ayios Athanasios, 19.vi.24 (2 ♂); Cherkas, vii.35 (2 ♀, 2 ♂).

♀. Length 6-7.5 mm., but one specimen reaches 9 mm. Head slightly broader than long; clypeus twice as broad as long, strongly prominent apically, about as long as a half of scape of antennae; upper lip nearly three times longer than broad, slightly narrowed towards the broad apex; maxillary palpi short and broad, 4-jointed; antennae massive and long, reaching scutellum; scape rather short and straight; second joint of flagellum nearly one and a half longer than its width at apex; third as long as broad; fourth to tenth distinctly longer than broad; apical joint twice as long as broad; scutellum broad, nearly flat, with small median impression at its apical half; postscutellum with small but

distinct median elevation; tergite VI trapezoidal, broad, apically as broad as its length, lying obliquely dorso-ventrally; sternite V nearly twice as broad as long and prominent towards the apex of tergite VI, with blunt apical margin and delicate indistinct median keel, which is as long as two-thirds of tergite length; apical lobes of sternite VI large and massive, with acute apex; median interlobal emargination small, triangular.

Slightly shining; clypeus, legs (partially) and metapleura covered with small and dense punctures, nearly dull; upper lip covered with rather large and coarse punctures, more numerous on basal half, indistinctly longitudinally rugose; head and thorax covered with large closely-set punctures which sometimes join together; distances between punctures equal from about a quarter to one-half of their diameter; punctures of abdominal tergites I-V small and dense; these punctures distinctly smaller on apical halves of tergites, distance between them being equal to from one-half to two-thirds of their diameter; tergite VI shining with rather large and closely-set punctures.

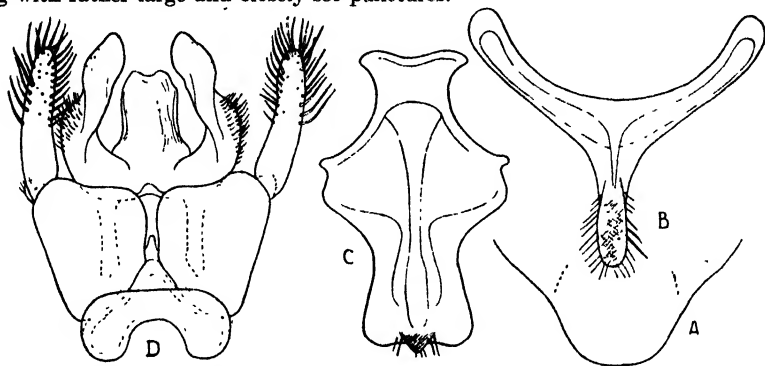


FIG. 1.—*Annobates mavromoustakisi* sp. n. ♂. Dorsal view of tergite VII (A), sternites VII (B) and VIII (C) and genitalia (D).

Black; upper lip and mandibles dark red; antennae, tegulae, calli, humerales, legs and abdomen red.

Hairs all pale golden-yellow, short; hairs on face, tempora, vertex, propleura and median segment very dense; basal half and lateral sides of tergite I covered with very dense and short white hairs; tergites II-IV with lateral patches of white dense hairs, gradually enlarged towards the apex of abdomen, and on tergite VI separated to a quarter of tergite width; apical band of tergite V entire, hairs short, white; hairs of tergite VI long, erect, very dense apically; hairs of legs short, rather dense on coxae, outer sides of hind tibiae and first joint of tarsi.

♂. Length 6-7.5 mm. Like the female. Third joint of antennal flagellum distinctly shorter than long; fourth to eighth as long as broad; ninth to eleventh distinctly longer than broad; twelfth about twice as long as broad; tergite VI (fig. 1, A) rather small, rounded and distinctly prominent apically; sternites VII and VIII and genitalia as in fig. 1, B, C, D respectively.

Slightly shining; body puncturation distinctly sparser; on mesothorax distance between punctures equal one-half of their diameter; on abdominal tergites puncture distances equal to one or more of the diameter of punctures; tergite VI with rather large, closely-set punctures.

Black; the following are reddish: upper lip, mandibles, antennae beneath, tegulae, tibiae of the first and the second pairs of legs and all tarsi; abdomen dark, and only segments I and II dark red; sometimes tegulae black, upper lip and tarsi pale reddish, tergites I-III pale reddish and those following all somewhat darker; apical margin of tergites yellowish.

Hairs of head, thorax, and legs rather denser; basal half and sides of tergite I covered with very dense and short white hairs; antero-lateral patches of tergites II-V larger, gradually enlarged, and on tergite V the patches separated by a very narrow median space; apical band of tergite VI entire.

The species belongs to the group of *A. nigrinus* F. Mor.; the group includes rather numerous species from Caucasus and Middle Asia; descriptions of some of these species are still unpublished; *A. mavromoustakisi* sp. n. differs from all others known to the author by such characters, as colour and puncturation, and mainly by the form of sternites VII and VIII and the male genitalia; basal part of sternite VII extremely large, bearing very strong muscles, and apical half of sternite without lateral spinous spaces.

A. mavromoustakisi sp. n. varies in length and colour; specimens from Cherkas very small (♂♂—6.0 mm., ♀♀—6.6-6.5 mm.); a female from Limassol very large (9.0 mm.); males from Limassol and Ayios Athanasios larger and darker. It seems that there are no intermediates between the two types in colour and size, which may be due to the parasitism of two different host-species.

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A NEW SPECIES OF *HOMOBIZZIA* (DIPTERA, CERATOPOGONIDAE) FROM EGYPT

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A COLLECTION of biting midges made by Major O. Theodor in the Maadi area, Cairo, between August and November, 1943, and sent to me for examination contained the following species :—*Alluaudomyia melanosticta*, 1 ♀; *Atrichopogon aegyptius*, 9 ♀; *A. homoius* (= *A. alfieri* K.), 1 ♂, 12 ♀; *Culicoides distinctipennis* var. *egypti*, 2 ♂, 1 ♀; *C. kingi*, 5 ♀; *C. puncticollis*, 25 ♀; *C. schultzei*, 7 ♂, 187 ♀; *Dasyhelea* sp. probably *fusca*, 2 ♀; *D. inconspicua* var. *egypti*, 3 ♂, 4 ♀; *Forcipomyia ingrami*, 5 ♂, 1246 ♀; and *F. moascari*, 4 ♂, 14 ♀. It contained also four specimens (1 ♂, 3 ♀) of a new species of *Homobezzia* which

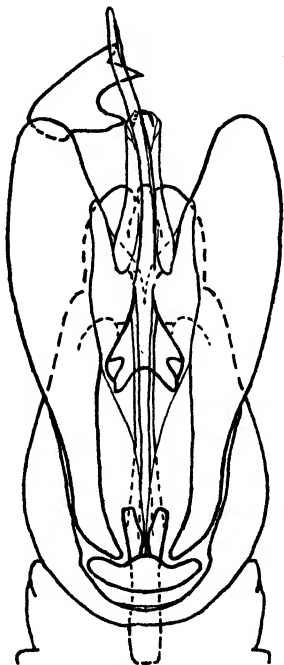


FIG. 1.—*Homobezzia atrata* sp. n., hypopygium of male, ventral view.

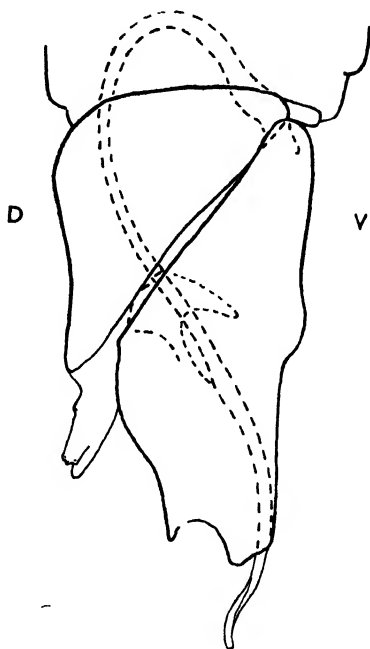


FIG. 2.—*Homobezzia atrata* sp. n., hypopygium of male, lateral view.

although all damaged are described below because their striking characters should make them easy to recognise in future collections. The identification of one of the species of *Atrichopogon* as *A. aegyptius* K. requires confirmation by examination of males, but support is given to it by the fact that the type specimens examined by Kieffer also came from Maadi. When forwarding the collection, in which females of *F. ingrami* preponderate so largely, Major Theodor wrote that the midges "appeared in enormous numbers after the flood, but they did not seem to bite man at all."

***Homobezzia atrata* sp. n.**

An almost black species with all the femora and tibiae blackish, the tarsal segments pale brown or nearly colourless, only the fore femora armed, the fourth tarsal segments sub-cylindrical, and the fifth unarmed.

Male and female. Length of wing 1.3 to 1.4 mm., greatest breadth 0.35 to 0.5 mm.

Head almost black. Eyes bare, separated above. Palpi pale brown: lengths of last three segments in one female about 11, 9, and 12 units¹ respectively, the third not inflated, without pit. Mandibles of female highly chitinated, armed with a dozen strong teeth. Antennae missing from all the specimens.

Thorax almost black, without thoracic tubercle. A group of strong bristles above insertions of wings. Scutellum almost black, bearing about six bristles and numerous small hairs.

Wings unadorned, without macrotrichia. Anal lobe well developed. Costa extending in female about three-quarters length of wing and terminating a little beyond level of end of Cu 1; in male shorter, nearly two-thirds length of wing. Single radial cell long, narrow. Fork of M in female slightly proximal to cross-vein, the distance from fork to cross-vein shorter than cross-vein; in male forking practically at cross-vein. M 1 ending a little below tip. Fork of Cu distal to level of cross-vein, its branches forming an acute angle. Halteres with dark brown knobs.

Legs with all femora and tibiae blackish; tarsal segments pale brown or almost colourless, but fifth segments slightly more infuscated. Femora not swollen; only fore femora armed, with two short spines. Femora and tibiae well clothed with bristles none of which is especially large with the exception of a few (4) on the hind tibiae of the male. T.R. about 2.3. Fourth tarsal segments sub-cylindrical; fifth unarmed. Claws of female missing from middle legs but the others, namely those of the fore and hind legs, equal, about half length of fifth tarsal segment, each with small barb on inner side. Claws of male small, about one-third length of fifth tarsal segment, equal, with bifid tips.

Abdomen blackish above, paler beneath, especially anteriorly. Gland rods in female present on 7th tergite, very long. Spermathecae two, well chitinated, irregularly oval, unequal, measuring in one specimen about 103 μ by 55 μ and 52 μ by 31 μ respectively; the duct very narrow, and not at all chitinated. Hypopygium very dark and of unusual form, appearing in lateral and ventral views as shown in the figures (figs. 1 and 2), which are, however, mere outlines drawn from the specimen after partial maceration in caustic potash and clearing in pure carbolic acid. Homologies of internal structures obscure. Claspers black, very short, ending in three short processes, which are not shown in the sketch of the lateral view.

EGYPT: Maadi area, Cairo, 1-7 October 1943, 1 ♂, 3 ♀ (*Major O. Theodor*).

¹ The unit referred to is approximately 3.7 μ .

ON THE CHINESE AND JAPANESE SPECIES OF *HYPHYDRUS* (COL., DYTISCIDAE)

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ACCORDING to Zimmermann (1930) only five species of *Hyphydrus* are to be found in China and Japan, viz. :—

- excoffieri* Régimbart (1899).
- Excoffieri* Zimmermann (1930) *err. scrips.*
- japonicus* Sharp (1873).
- frontalis* Sharp (1882).
- laeviventris* Sharp (1882).
- lyratus* Swartz (1808).
- orientalis* Clark (1863).
- pulchellus* Clark (1863).
- eximius* Clark (1863).

but to these must be added the following five species described since that date :—

- wui* Gschwendtner (1932).
- detectus* Falkenström (1936).
- pieli* Guignot (1936).
- flavomaculatus* Kamiya (1938).
- falkenströmi* Gschwendtner (1939).

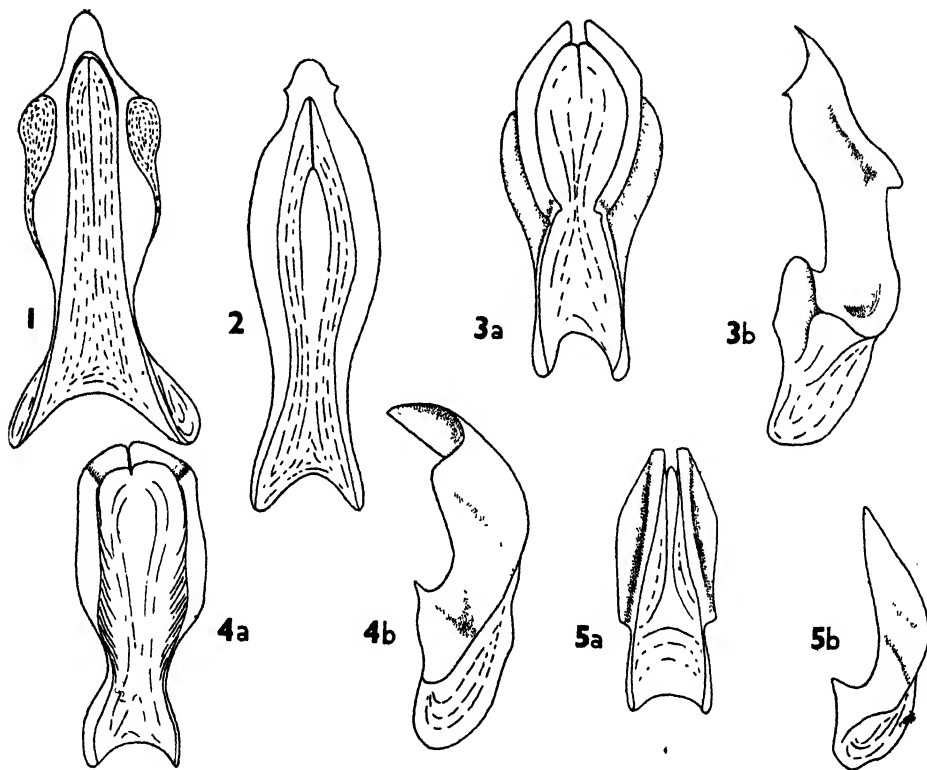
the total of thirteen names supposedly representing ten effective species.

Falkenström (1933, 1935) mentions *orientalis* Clark and in 1936 separated a distinct species, *detectus*, comparing it with his supposed *orientalis* and giving figures of the aedeagus of the two species. Gschwendtner (1939) suggested that Falkenström's supposed *orientalis* was, in fact, *japonicus* Sharp and that *detectus* should be the true *orientalis* of Clark. He had previously (1932) given a description of the aedeagus of a species which he called *orientalis* and this aedeagus was identical with that of *detectus* and this was the basis of his synonymy. Falkenström wrote to me in 1939 requesting the loan of typical *orientalis* Clark, and I sent him a short series in that year. In 1940 he published a clarification of the position of the three species *orientalis* Clark, *japonicus* Sharp and *detectus* Falkenström based on that material, further stating, on my authority, that *japonicus* Sharp was actually a synonym of an older described species. Disorganisation caused by the war prevented an earlier publication of the present paper designed to make a complete clarification of the status of all names published of the Chinese and Japanese species of the genus.

It is possible to exclude *excoffieri* Rég. and *lyratus* Swartz with equal punctuation on the dorsum as being quite distinct species which are unlikely to be confused with any others from the same area. It also seems that *flavomaculatus* Kamiya, known to me only by the five-line "description" in Gschwendtner (1939), can be excluded from the discussion as being quite distinct by its small size. The remaining ten names, however, contain many problems.

The true *orientalis* Clark has been redescribed by Falkenström (1940) and the aedeagus figured. It is clear that his original conception of this species (1933) was erroneous and that the species so named in his papers of 1933, 1935

and 1936 is actually *japonicus* Sharp. The *orientalis* of Gschwendtner, being the same species as *detectus* Falkenström, is therefore not conspecific with *orientalis* Clark and the question therefore arises as to what species, if any, of Gschwendtner (1939) can be the true *orientalis*. There appears to be but a single species, *falkenströmi*, which could represent this and in fact his description, so far as it goes, suits the type series of *orientalis* Clark (three males, two females) from Amoy so closely as to leave no doubt in my mind that the two names are synonymous. The *orientalis* of Zimmermann (1930) is evidently a



FIGS. 1-5.—1, *Hyphydrus laeiventris* Sharp. Cotype. Aedeagus, ventral view; 2, *Hyphydrus eximius* Clark. Cotype. Aedeagus, ventral view; 3, *Hyphydrus orientalis* Clark. Cotype. a. Aedeagus, ventral view. b. lateral view; 4, *Hyphydrus detectus* Falkenström. a. Aedeagus, ventral view. b. lateral view; 5, *Hyphydrus pulchellus* Clark. a. Aedeagus, ventral view. b. lateral view. All figures to same scale.

composite species, Gschwendtner stating that a study of Zimmermann's collection had led him to synonymise *detectus* with "*orientalis*," and specimens in the British Museum (N.H.) from Foochow, identified by Zimmermann, are partly true *orientalis* Clark, partly *detectus* Falkenström and partly a third species mentioned below.

H. detectus is a species quite distinct from the true *orientalis* Clark, the median lobe of the aedeagus being more transversely rounded at the apex, the sides of the "gutter" in the middle smooth and without a rounded tubercle and the terminal hair tuft of the parameres is very conspicuously shorter. *H. pieli* Guignot (1936) is known to me only by description but the figure of the aedeagus

agrees exactly with that organ of *detectus*; there can be no doubt that the two names are synonymous and that *detectus*, dated 30th January 1936, must take precedence over *pieli*, dated 25th September 1936.

Sharp (1882), without examining the types of Clark's three species *orientalis*, *pulchellus* and *eximius*, states that: "I believe that *pulchellus* Clark and *eximius* Clark will prove to belong to this species (*orientalis*).” This opinion has never been challenged and all subsequent authors have accepted this synonymy. The type series of *eximius*—a male and a female, the latter bearing the British Museum type label—have been examined and the aedeagus extracted. The species was then found to be quite distinct from *orientalis* and, in fact, to be *japonicus* Sharp, described ten years later and it is therefore necessary to replace the name *japonicus* by *eximius* Clark. Sharp (1884) had himself reduced *frontalis* Sharp (1882) to synonymy with *japonicus* and dissection of the male types of each "species" has confirmed this treatment.

H. pulchellus Clark is represented in the type series by two females. Examination suggested that this was certainly a species distinct from *orientalis* Clark and a study of the remainder of the *orientalis* series in the British Museum produced four specimens from Foochow, identified by Zimmermann as "*orientalis*," which were clearly conspecific with the *pulchellus* types. One of this Foochow series was a male and extraction of the aedeagus confirmed the opinion, formed on the types of *pulchellus*, that that species was specifically distinct from *orientalis*. *H. wui* Gschwendtner (1932) was described from three females and a comparison of the description with the type of *pulchellus* leaves no possibility of doubt that Gschwendtner, misled by Sharp's erroneous synonymy, was merely re-describing that species under the impression that he was dealing with an undescribed one, an error the more excusable in view of the manifest impossibility an actual study of the specimens demonstrated, that *orientalis* Clark and *pulchellus* Clark could be the same species.

H. laeviventris Sharp (1882) has never been in any doubt and a dissection of a male paratype confirms the validity of the species.

The number of species in China and Japan is therefore eight and the synonymy is as follows :—

<i>excoffieri</i> Régimbart (1899).	CHINA.
<i>excoffieri</i> Zimmermann (1930) <i>err. scrips.</i>	
<i>lyratus</i> Swartz (1808).	CHINA, E. INDIES.
<i>bisulcatus</i> Clark (1863).	
<i>nigronotatus</i> Clark (1863).	
♀ <i>fossulipennis</i> MacLeay (1871).	
<i>flavomaculatus</i> Kamiya (1938).	JAPAN.
<i>orientalis</i> Clark (1863).	CHINA.
<i>orientalis</i> Zimmermann (1930) <i>pars.</i>	
<i>falkenströmi</i> Gschwendtner (1939).	
<i>orientalis</i> Falkenström (1940).	
<i>eximius</i> Clark (1863).	CHINA, JAPAN.
<i>japonicus</i> Sharp (1873).	
<i>frontalis</i> Sharp (1882).	
<i>orientalis</i> Falkenström (1933, 1935, 1936).	
<i>japonicus</i> Falkenström (1940).	
<i>detectus</i> Falkenström (1936).	CHINA.
<i>pieli</i> Guignot (1936).	
<i>orientalis</i> Zimmermann (1930) <i>pars</i> ; Gschwendtner (1939).	

pulchellus Clark (1863).

CHINA.

wui Gschwendtner (1932).

orientalis Zimmermann (1930) *pars*.

laeviventris Sharp (1882).

JAPAN.

The following key may serve to distinguish the species, but females of *orientalis* Clark and *eximius* Clark are not separable except by reference to males.

- 1 (6). Punctuation of dorsum dense and equal.
- 2 (5). Size over 4.0 mm.
- 3 (4). Elongate-oval; head red, pronotum mostly red; male with first ventrite produced into a strong, backward-projecting median spine on the hind margin; female with a deep elongate fovea on the elytra near the middle *lyratus* Swartz.
- 4 (3). Broadly oval; head brownish, pronotum black; male without a median spine on the first ventrite; female without an elongate fovea on the elytra *excoffieri* Rég.
- 5 (2). Size under 3.0 mm. *flavomaculatus* Kamiya.
- 6 (1). Punctuation of dorsum more or less dense and unequal, of larger and smaller punctures.
- 7 (8). Punctuation of dorsum very unequal, the larger punctures evidently much larger than the smaller punctures *laeviventris* Sharp.
- 8 (7). Punctuation of dorsum not very unequal, the larger punctures not very much larger than the smaller punctures.
- 9(10). Punctuation less dense on the dorsum, the interstices between the smaller punctures distinctly greater than the diameter of the larger punctures; the surface more shining *pulchellus* Clark.
- 10 (9). Punctuation more dense, the interstices between the smaller punctures not greater than the diameter of the larger punctures; surface less shining or dull (dimorphic females).
- 11(12). Prosternal process in both sexes with, at most, a very weak longitudinal keel. *detectus* Falk.
- 12(11). Prosternal process with a strong or very strong keel.
- 13(14). Second and third segments of the anterior and middle tarsi of the male less dilated, not much more than in the female; first ventrite of the male with small matt median protuberance *orientalis* Clark.
- 14(13). Second and third segments of the anterior and middle tarsi of the male more dilated, much more than in the female; first ventrite of the male with small shining median protuberance *eximius* Clark.

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NOTES ON SIMULIIDAE (DIPTERA). II

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EDWARDS (1931, 1934 and 1939) considered the family SIMULIIDAE to consist of but two genera: (i) *Parasimulium* Malloch, 1914, with one species *P. furcatum* Malloch, 1914; and (ii) *Simulium* Latreille, 1802, to which he assigned all the other species. Enderlein (1921a, 1930, etc.) has proposed to recognise no fewer than 50 genera within the family. A few generic names within the family have been proposed at one time or another by some other workers.

The majority of the students of the family have found the Enderleinian system extremely difficult to work. Edwards (1931) sank all the then extant genera of Enderlein as synonyms of *Simulium* and the genera that Enderlein has erected since then have no greater claim to generic status than those sunk by Edwards. At the same time Edwards (1931) sank such genera as other workers had erected at that time as synonyms. Edwards (1931) divided his genus *Simulium* into seven subgenera, *Prosimulium* Roubaud, *Cnephia* Enderlein, *Gigantodax* Enderlein, *Austrosimulium* Tonnoir, *Eusimulium* Roubaud, *Morops* Enderlein and *Simulium* Latreille (restricted), but later (1934) he combined the last three into one subgenus, *Simulium* Latreille (restricted). Edwards (1939) did not discuss the generic classification of the SIMULIIDAE in detail, but he indicated his adherence to the system proposed in the papers cited above.

It thus comes about that, if the system of classification proposed by Edwards is followed, then, with the exception of *Parasimulium* Malloch which is recognised as distinct by both Edwards and Enderlein, all the genera erected by Enderlein and others in the SIMULIIDAE must be regarded as synonyms of *Simulium* Latreille in the sense in which Edwards used the name.

The elimination of these genera as synonyms results in the appearance of a number of homonyms. Some of these have already been dealt with in published papers (*e.g.* Vargas (1943)); some, however, have not.

The purpose of the present paper is to deal with these homonyms in order that the species may be related to the generic classification of Edwards without confusion. The opportunity is taken of dealing with one or two other points of a similar nature. The fact that Edwards recognised subgenera does not of course affect the issue in respect of the homonyms. It may be noted that Enderlein is the author of many of the names applied to species that now require new names.

***Simulium asakakae* nom. n.**

pro *S. groenlandica* (Enderlein) 1936 : 114 (*Psilozia*).
 preoc. *S. groenlandica* Enderlein 1935 : 363 (*Simulium*).

Both species come from Greenland. The first species, for which the new name is proposed, is the genotype of *Psilozia* Enderlein (1936).

***Simulium orsovae* nom. n.**

pro *S. laticulx* (Enderlein) 1936 : 114 (*Cryptectemnia*).
 preoc. *S. laticulx* (Enderlein) 1934a : 291 (*Trichodagmia*).

A Rumanian and a Peruvian species respectively. The first species, for which the new name is proposed, is the genotype of *Cryptectemnia* Enderlein (1936).

Simulium costaricensis nom. n.

pro *S. rufidorsum* (Enderlein) 1936 : 119 (*Acropogon*).
 preoc. *S. rufidorsum* (Enderlein) 1934a : 283 (*Psilopelmia*).

A Costa Rican and a Peruvian species respectively.

Simulium rövdeae nom. n.

pro *S. arctica* (Enderlein) 1936 : 119 (*Schönbaueria*).
 preoc. *S. arcticum* Malloch 1914 : 37 (*Simulium*).

Enderlein's species is from Norway while Malloch's is from North America and Greenland.

Simulium wilhelmlandae nom. n.

pro *S. pygmaea* (Enderlein) 1922 : 70 (*Wilhelmia*).
 preoc. *S. pygmaea* Zetterstedt 1838 : 802 (*Simulium*).

Enderlein's species, originally described in *Wilhelmia*, is the genotype of *Morops* Enderlein (1930); it comes from New Guinea. Zetterstedt's species comes from Lapland.

Simulium bilimekæ nom. n.

pro *S. mexicana* (Enderlein) 1934b : 190 (*Hemicnetha*).
 preoc. *S. mexicanum* Bellardi 1862 : 6 (*Simulium*).

Both species are Mexican. The first is the genotype of *Hemicnetha* Enderlein (1934b).

Simulium tangæ nom. n.

pro *S. limbatum* Enderlein 1921a : 200 and 1921d : 78 (*Simulium*).
 preoc. *S. limbatum* Knab 1915 : 280 (*Simulium*).

Knab's species is from British Guiana; Enderlein's from East Africa.

Simulium sicuani nom. n.

pro *S. limbata* (Enderlein) 1934a : 282 (*Ectemnaspis*).
 preoc. *S. limbatum* Knab 1915 : 280 (*Simulium*).
 and *S. limbatum* Enderlein 1921a : 200 and 1921d : 78 (*Simulium*).

Ectemnaspis limbata was described from Peru.

Simulium canbalicum nom. n.

pro *S. balcanicum* (Enderlein) 1929 : 224 (*Prosimulium*).
 preoc. *S. balcanica* (Enderlein) 1924 : 285 (*Wilhelmia*).

Both are Bulgarian species.

Simulium lurybayæ nom. n.

pro *S. angustifrons* (Enderlein) 1934a : 292 (*Trichodagmia*).
 preoc. *S. angustifrons* (Enderlein) 1921a : 200 and 1921b : 213 (*Nevermannia*).

The first species is from Peru, the second from France. Enderlein (1921b : 213) misspells the specific name as "*angustifrons*."

Simulium polæ nom. n.

pro *S. montanum* Enderlein 1921a : 200 and 1921b : 221 (*Simulium*).
 preoc. *S. montanum* Philippi 1865 : 633 (*Simulium*).

Philippi's species comes from Chile, Enderlein's from Germany. Enderlein (1930) transferred his species to *Odagmia*.

Simulium pseudohirtipes nom. n.

pro *S. nigripes* (Enderlein) 1925 : 30 (*Prosimulium*).
 syn. *S. hirtipes* Fries of Edwards (*plur. loc.*).
 preoc. *S. nigripes* (Abreu) 1922 : 30 (*Melusina*).
 Not *S. hirtipes* Fries of Enderlein (*plur. loc.*) (*Prosimulium*).

Enderlein (*loc. cit.*) maintains that the species which Edwards has in various places identified as *S. hirtipes* Fries is not, in fact, that species but a different one to which he, Enderlein, has applied the name *nigripes*. The new name is required in case Enderlein's contention should, unexpectedly, prove correct. According to Enderlein (1925 and 1922) *S. hirtipes* Fries (of Enderlein) has as a synonym *S. tomosvaryi* Enderlein (1921a : 200 and 1921b : 215). If Enderlein is in error in his identification of *S. hirtipes*, then the name *S. tomosvaryi* Enderlein is available.

Simulium meunieri nom. n.

pro *S. affinis* Meunier 1907 : 387.
 preoc. *S. affinis* Stephens 1829 : 254.

The former is a fossil; the latter was published as a *nomen nudum* but, the material seen by Stephens having been available to him, Edwards (1915) gave the name as a synonym of *S. variegatum* Meigen.

Simulium baracorne nom. n.

pro *S. ruficorne* (Baranoff) 1926 : 191 (*Odagmia*).
 preoc. *S. ruficorne* Macquart 1838a : 88 and 1838b : 84.

Baranov's species comes from Jugoslavia. Macquart's species is an Ethiopian one which does, however, extend to North Africa and Palestine. Synonyms of *S. ruficorne* Macquart are, according to authors, *S. beckeri* Roubaud, *S. divergens* Pomeroy and *S. annulipes* Becker (not *S. annulipes* Shiraki : see immediately below).

Simulium nacojapi nom. n.

pro *S. japonica* (Shiraki) 1935 : 49 (*Odagmia*).
 preoc. *S. japonicum* Matsumura 1931 : 407.

Both are Japanese species. *S. annulipes* Shiraki is, according to Kono and Takahasi (1940), a synonym of *S. japonicum* Matsumura and thus no new name is required for it (not *S. annulipes* Becker : see immediately above).

Simulium figueroa nom. n.

pro *S. simile* Silva Figueroa 1917 : 33.
 preoc. *S. similis* Malloch 1914 : 42c.
 Not *S. simile* (Tonnoir) 1925 : 249 (*Austrosimulium*).

Silva Figueroa's species is quoted by authors as "*simile* Silva" and "*simile* Figueroa"; it is Chilean. Malloch's species is from North America and, according to Dyar and Shannon (1927), is a synonym of *S. arcticum* Malloch, 1914.

Simulium austrosimile nom. n.

pro *S. simile* (Tonnoir) 1925 : 249 (*Austrosimulium*).
 preoc. *S. simile* Silva Figueroa 1917 : 33.
 and *S. similis* Malloch 1914 : 42c.

Tonnoir's species is described from Tasmania.

Simulium jerichoensis nom. n.

pro *S. flavipes* Austen 1921 : 116.
 preoc. *S. flavipes* Stephens 1829 : 254.

Austen's *flavipes* comes from Palestine. The Stephens species is a *nomen*

nudum but, the material seen by Stephens being available to him, Edwards (1915) gave the name as a synonym of *aureum* Fries.

***Simulium irakae* nom. n.**

pro *S. bipunctatum* Austen 1923 : 275.

preoc. *S. bipunctatum* Malloch 1912 : 650.

Austen's species comes from Mesopotamia; he (*loc. cit.*) also described a variety of it from Palestine, which he named var. *buxtoni*. Knab (1913) sank *bipunctatum* Malloch (December 1912) as a synonym of *dinellii* Joan (April 1912).

Simulium pertinax Kollar 1832 : 19.

Syn. *S. venustum* Say of Lutz 1909 : 136.

Syn. *S. distinctum* Lutz 1910 : 341.

Syn. *S. lutziana* (Enderlein) 1934a : 291 (*Trichodagmia*) (preoc. & *lutzianus* Pinto 1932 : 748).

Not *S. distinctum* Malloch 1913 : 133.

Pinto's *lutzianus* has priority but since the Enderleinian species sinks as a synonym no new name is required. Malloch's *distinctum* is dealt with immediately below. *S. pertinax* is a South American species; material from these regions identified as *venustum* Say is this species. The synonymy given above is after Lane and Porto (1939), who also give *S. inexorabile* Schrottky and *S. flavifemur* (Enderlein) (*Chirostilbia*) as synonyms.

Simulium trivittatum Malloch 1914 : 30.

Syn. *S. distinctum* Malloch 1913 : 133.

preoc. *S. distinctum* Lutz 1910 : 341.

Dyar and Shannon (1927) erroneously stated that *distinctum* Malloch was described in Malloch's paper of 1914 and they appear to have made the species an inferior synonym of *trivittatum* Malloch simply because the description of the latter is above notes on the former on the same page. The facts are that, *distinctum* being preoccupied, *trivittatum* is the earliest available synonym by which the species can be called. Lutz's species is a synonym of *pertinax* Kollar (see immediately above).

Simulium chilianum Philippi in Rondani 1863 : 90 and *S. chilense* Philippi 1865 : 634.

In a footnote in his catalogue Kertész (1902 : 286) hinted that these two species might be synonymous; he also erroneously gave the date of the paper in which *S. chilianum* was published as 1865 and attributed the species to Rondani.

Pinto (1932 : 728) gave the two species as distinct but, like Kertész (*loc. cit.*), he erroneously gave the date of publication as 1865 and attributed the species to Rondani. The context in Pinto's paper indicates that he must have had his particulars of *S. chilense* from Philippi's original paper but his information about *S. chilianum* from Kertész's catalogue.

Reed (1888 : 8) lists *S. chilense* in his catalogue of Chilean Diptera but omits *S. chilianum*. The introduction to his catalogue and the contents indicate that he was not aware of Rondani's paper (*loc. cit.*), in which some three dozen Chilean species of Diptera are dealt with, and many of those described as new are attributed by Rondani to Philippi.

Edwards (1931 : 139) treats *S. chilense*, but omits any mention of *S. chilianum* either as a valid species or as a synonym.

S. chilianum is the only species of *Simulium* noted in Rondani's paper; *S. chilense* is one of seven species noted in Philippi's paper.

Rondani's paper is not readily accessible and his brief diagnosis or description is quoted in full herewith :

" Gen. SIMULIUM Mgn.

" Sp. n. CHILIANUM Phil.—Long. Mill. 3.

" Ater opacum, leviter grisei adpersum; pedibus, praesertim posticis,

" paulo lutei sericeis—Alae limpidae.

" Chiliae—Philippi."

Philippi's paper is more accessible and in addition Edwards (*loc. cit.*) has identified *S. chilense* and given notes on the species which he assigned to the subgenus *Gigantodax* Enderlein as defined by Edwards (*loc. cit.*). The original diagnosis may, however, be quoted with advantage since it immediately shows that *S. chilense* cannot be the same species as *S. chilianum*.

" 6. *S. chilense* Ph. S. oculis antennisque fuscis; thorace laete rufo; abdomine nigro pedibus pallide testaceis. Long. corp. $1\frac{1}{2}$ lin., extens. alar. $4\frac{1}{2}$ lin.

" Marem e prov. Valdivia attuli."

This is followed by some notes on the species in the German language.

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LEPTOCERA DOWNESI SP. N. (DIPTERA, SPHAEROCERIDAE)
BREEDING IN SPROUTING WHEAT

By O. W. RICHARDS, M.A., D.Sc., F.R.E.S.

Leptocera downesi sp. n.

♂♀. Somewhat bronzy black, thorax moderately shining; head, pleura and legs greyish dusted; buccae, centre of pleura, coxae and trochanters somewhat yellowish tinged; halteres pale yellow with a dark stalk. Wings slightly infuscated. Length (body) about 2.0 mm.; wings ♀ 2.15 mm., ♂ 1.89 mm.

Head on each side with one vibrissa and one almost equally long, upturned jowlar bristle. Vertex produced into a considerable rounded knob between the well-separated antennae, in profile genae distinctly visible in front of eyes. Arista two and a half times as long as antenna (or a little longer) with short, not very dense pubescence. Four interfrontal bristles of about same size. One strong and two weak humeral bristles; five pairs of weak

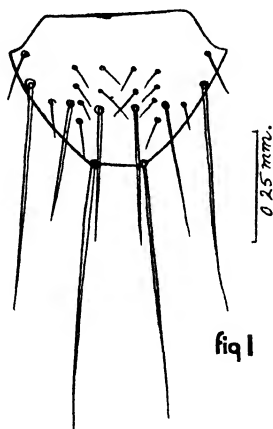


FIG. 1.—Dorsal view of scutellum.

dorso-centrals; acrostichals weak, only just distinguishable from the microchaetes, three pairs in front of thorax separated by one row of microchaetes and a scarcely longer pre-scutellar pair behind. Sternopleuron with one strong and one weaker anterior bristle. Scutellum (fig. 1) with two pairs of strong bristles, a rather weak bristle between them, set in a little from the margin, and a very weak anterior bristle, one moderately strong pair on the posterior part of the disk and a number of minute bristles in front of this pair and between it and the sides. Wings (fig. 2) with first sector of costa bristly, 3-5 of the bristles directed upwards and posteriorly, the two proximal ones of these bristles large, costa not overpassing R_{4+5} , second sector of costa about twice as long as third, R_{2+3} regularly but not very strongly sinuate, R_{4+5} slightly curved towards costa (distinctly more than *L. fuscipennis* (Hal.); less than in such species as *L. ensenada* Rich.), M_{1+2} produced to costa as a fold which is nearly parallel to R_{4+5} , M_{3+4} very shortly produced beyond the cell, allula narrow. Fore legs simple; mid trochanter with strong curved bristle; mid femur in ♂ at base ventrally with a short stout bristle with end a little curved; mid tibia at $\frac{1}{2}$ with two pairs of bristles (lower pair the stronger) surmounted by a single bristle, at

PROC. R. ENT. SOC. LOND. (B) 13. PTS. 11-12. (DECEMBER 1944.)

4 with a pair of strong bristles and a weaker one (surmounted by a very small bristle) in front and a little before them, ventrally with a small central and a preapical bristle; basi-

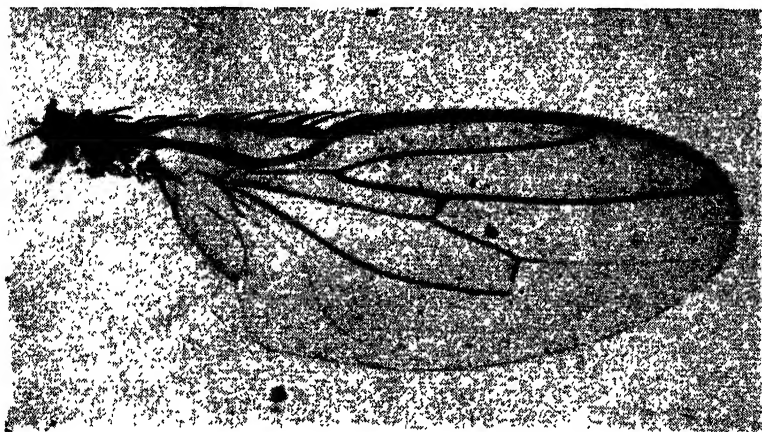
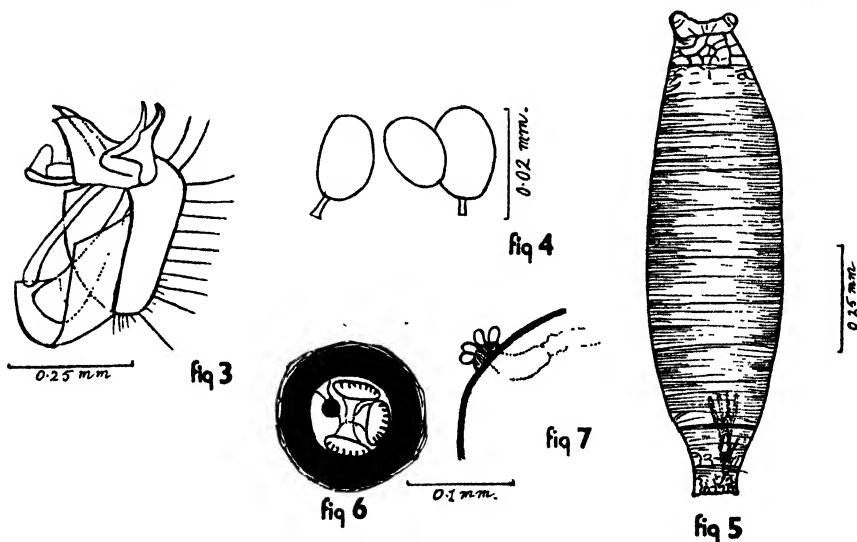


FIG. 2.—Right wing.

The photograph of the wing was kindly taken for me by Dr. R. Dennell.

tarsus with a strong ventral bristle; hind femur with some antero-ventral bristles near tip; tibia with scattered bristles nearly as long as diameter of tibia, second tarsal segment



FIGS. 3-7.—3, Male genitalia from right side; 4, female spermathecae; 5, dorsal view of puparium; 6, end view of one posterior spiracular process; 7, one anterior spiracular process.

nearly twice as long as first. Male genitalia (fig. 3) small and inconspicuous, with short pubescence, forceps usually invisible, small and hook-like; last visible dorsal segment of female, dull, unsculptured, cerci very small, without bristles, three unsculptured spermathecae (fig. 4).

Type ♂, allotype ♀, 23 ♂, 34 ♀ paratypes, bred from damp sprouting Plate wheat in a ship's hold, Glasgow, v.1944 (*J. A. Downes*); 4 ♂, 3 ♀ paratypes, in Plate flour infested by various beetles and by *Ephesia cautella* (Walk.), in a ship's hold, Glasgow, viii.1944 (*J. A. Downes*). Type, allotype and some paratypes will be deposited in the British Museum (Natural History).

This species belongs to the group of *L. fuscipennis* Hal. and is almost certainly a native of Argentina. In Duda's key (1925, *Arch. Naturg.* **90A**, Heft 11 (1924) : 15), it runs down to couplet 28. R_{4+5} is less strongly bent than in *L. divergens* Duda and *L. pluriseta* Duda but more strongly so than in *L. fuscipennis* (Hal.). The pair of strong discal scutellar bristles is not found in any of these species, nor in *L. decimsetosa* Richards, 1931.

The puparium (figs. 5-7) is a little different from any of those figured by myself (*Proc. zool. Soc. Lond.* **1930** : pl. 1) or Goddard (1938, *Trans. Soc. Brit. Ent.* **5** : 235-58, 13 figs.).

STUDIES ON SOME INDIAN THYSANOPTERA

By SHUMSHER SINGH, B.Sc., Assoc. I.A.R.I.

SINCE the publication of my "Contribution to the Knowledge of Indian Thysanoptera"¹ I have collected a further mass of data, which is presented below. I am greatly indebted to Dr. Hem Singh Pruthi, the Imperial Entomologist, and to Mr. M. C. Cherian, the Entomologist, Madras, for the facilities they kindly provided during my work in their laboratories. To Rao Sahib Dr. T. V. Ramakrishna Ayyar I express my gratitude for advice and encouragement.

The paper deals with the following :—*Neolimothrips* Shumsher; *Limothrips* (*Neolimothrips*) *brachycephalus* (Shumsher); *Limothrips* (*Neolimothrips*) *saccharivora* sp. n.; *Hydatothrips solanifolii* sp. n.; *Scirtothrips* Shull; *Anaphothrips* (*Scirtothrips*) *dorsalis* (Hood).

Neolimothrips Shumsher.

1942, *Neolimothrips* Shumsher, *Indian J. Ent.* **4** (2) : 118.

From the fact that this genus differs from *Limothrips* Haliday as restricted by Shumsher (*op. cit.* : 117-8) significantly only in having two postangular prothoracic setae instead of one, in the same way as *Dichaetella* Pr. differs from *Monochaetella* Pr., it is better to regard *Neolimothrips* as a subgenus of *Limothrips*.

Limothrips (*Neolimothrips*) *brachycephalus* (Shumsher).

1942, *Neolimothrips brachycephalus* Shumsher, *Indian J. Ent.* **4** (2) : 118.

This species was described from one female and two males collected in October 1940 on *Pennisetum typhoideum* in Ambala Cantonment by me. I have collected a female within a tender rolled-up leaf of *Bambusa arundinacea* at Coimbatore in July 1944.

¹ 1942, *Indian J. Ent.* **4** (2) : 111-35.

***Limothrips (Neolimothrips) saccharivora* sp. n.**

Female.—Length about 1.35–1.5 mm. General colour almost chestnut-brown, the thorax a little yellowish, segment 10 of abdomen black-brown. Legs brown; fore tibiae light yellow, shaded with brown basally; tips of intermediate and hind tibiae yellowish; all tarsi light yellow. Antennal segments 1, 2 (except at tip), 6, 7 and 8 concolorous with head; segment 2 near tip and segments 3–5 yellow. Wings yellowish.

Head very little longer than wide at base, where it is widest; produced between the eyes into an anteocular antenniferous process which is about $\frac{1}{4}$ as long as head. Interocellar bristles conspicuously long (30 microns), anteocular series of four setae about 13 microns long, postocular series short. Eyes not protruding (about 42 microns long), less than half the length of the head and a little shorter than the cheeks. The ocelli about as large as the largest facets of the eyes; the front ocellus about a third of the length of eye behind the front margin of the eyes. Antennae about 1.5 as long as head, 8-segmented; 1st segment short, broad, cylindrical; 2nd barrel-shaped; 3rd stalked, elongate-cup-shaped; 4th and 5th oval with constricted bases; 6th elongate-oval, tapering distally; stylar segments thin, tapering to tip. Sense-cones thin, long, simple and inconspicuous. Mouth-cone sharply pointed, very long, surpassing base of prosternum, constricted at middle from where the two-segmented maxillary palpi arise; the basal palpal segment short, cylindrical; the apical much longer, tapering distad in the same way as in *brachycephalus* Sh.

Prothorax about 1.2 as broad as long, bristles at hind angles slender, the inner one slightly longer than the outer and about 0.35 as long as the pronotum. Mesothorax broader than pro- or metathorax; metathorax about as long as broad. Legs normal.

Wings well developed. Fore-wing: costa with 24–26 setae, upper vein with 6–8 basal (in two groups of 3 or 4) and two apical setae; lower vein with 9 or 10 setae; scale with 4 setae on anterior margin, one surfacial seta and two “sense-cones.” All setae pale, slender and rather long.

Abdomen long and slender, apex acutely conical; segment 10 with a dorsal suture; 9th segment 1.25 as long as 10th. Bristles on 9th and 10th long, strong and conspicuous.

Measurements :

						Length	Breadth						
Head						0.19 mm.	0.18 mm.						
Pronotum						0.18 mm.	0.21 mm.						
Pterothorax							0.24 mm.						
Wing						0.90 mm.							
Antenna						0.28 mm.							
Antennal segments						I	II	III	IV	V	VI	VII	VIII
Length in microns						25	39	48	38	38	56	15	18
Breadth in microns						30	30	20	21	19	20	8	6

Male.—Body length 1.4 mm. Much resembling the female. Apex of abdomen rounded; hind margin of the 9th tergite produced into a pair of spine-set tubercles, one on each side of but some distance from the middle line. Penis pyriform, curved dorsally near tip.

Measurements :

							Length	Breadth		
Head							0.15 mm.	0.132 mm.		
Pronotum							0.15 mm.	0.154 mm.		
Pterothorax								0.186 mm.		
Wing							0.67 mm.			
Antenna							0.24 mm.			
Antennal segments			I	II	III	IV	V	VI	VII	VIII
Length in microns			25	35	41	36	30	45	14	16
Width in microns			28	27	18	19	19	18	8	5

Described from three females and one male collected by me on sugarcane leaves (within rolled tips) in Coimbatore on 15th July 1944.

This insect agrees in all details with *Bregmatothrips ramakrishnae* Bagnall, but has 2-segmented maxillary palpi. The description of *B. ramakrishnae* does not mention anything about the mouth-cone and the maxillary palpi. If *B. ramakrishnae* Bagnall is synonymous with *B. binervis* (Kobus) as has been suggested by Karny² and if as a *Bregmatothrips* Hood it has 3-segmented maxillary palpi, the very close resemblance between it and *L. (N.) saccharivora* with 2-segmented maxillary palpi is amazing and likely to shed valuable light on the value of certain characters (like processes of 9th abdominal segment of male) used in classification.

Key to the species of *Limothrips* (*Neolimothrips*).

Upper vein of fore-wing with 4 basal setae; pronotum more than 1.3 times
as broad as long *brachycephalus* Shumsher.
Upper vein of fore-wing with 6 or 7 basal setae; pronotum only about 1.2 as
broad as long *saccharivora* sp. n.

Hydatothrips solanifolii sp. n.

Female.—Length about 0.81 mm. General colour pale yellow. Antennal segment 4 near the tip, 5 (except near the base) and 6–8 entirely grey-infumate. Eyes black. Ocelli orange-yellow with red cups. Body setae yellow, inconspicuous. Apex of ovipositor amber-yellow.

Head about as long as broad across cheeks, broader across eyes; slightly projecting in front of eyes which are large and laterally protruding. The head is usually retracted into the prothorax up to the base of the eyes. The front margin of the vertex arched, surface in front of the ocelli depressed; occiput also slightly depressed in relation to the interocular ocelliferous "bridge." Surface faintly cross-striate. Cheeks slightly but broadly constricted in the middle. Interocular space about as wide as an eye which is 15 microns wide and 24 microns long from front margin to junction with cheek. Front ocellus small, directed forwards, and so to speak "pushed" in between the hind ocelli which are directed sideways and are contiguous with the inner hind angle of the eyes. The entire head, including the antennae, is devoid of conspicuous hairs. Mouth-cone heavy, rounded, reaching middle of prosternum, but appears to reach hind margin when the head is normally retracted. Maxillary palpi 3-segmented, the distal segment about as long as the basal two together and a little thicker than the labial palp. Antennae more than twice as long as the head; 8-segmented. Segments 3 and 4 with curved, forked, transparent sense-cones reaching to about the middle of the succeeding segment; segments 5 and 6 with a short external sense-cone. Segment 1 transverse, with straight sides; segment 2 barrel-shaped, outer side slightly more arched than inner; segment 3 pyriform, gradually narrowed to the basal stalk; segments 4 and 5 cup-shaped, emarginate distally, the 4th slightly bulging in the middle, the 5th has a ring-like basal constriction; 6th elongate-ovate, tapering towards apex; segments 7 and 8 short, tapering apically and forming a smooth cone with the apical half of 6th segment.

Prothorax longer than wide at the front margin and shorter than wide near hind margin. Front angles rectangular, hind angles rounded, the hind margin arched, sides and front margin straight. Surface faintly cross-striated with raised anastomosing transverse lines. A few very minute and inconspicuous hairs strewn over the shield.

Mesothorax much wider than long, with sides strongly arched.

² 1926, *Mem. Dept. Agr. India*, Ent. 9 (6) : 205.

Metathorax shorter than mesothorax, cylindrical, slightly widening posteriorly. Legs normal; fore and mid legs about equal, hind pair about a quarter longer; all tibiae with a pair of relatively stout setae near tip within.

Wings long and narrow. Fore-wings with a prominently yellow ambient vein and one longitudinal vein which in the distal $\frac{3}{4}$ of the wing length runs almost fused with the front marginal sector. Fringe sparse, on front margin starting beyond the basal third, and on hind margin beyond the basal quarter. Six or seven weak setae are borne by the lower edge of the longitudinal vein, and about 16 by the costa; these setae are extremely difficult to distinguish from the fringe.

Abdomen slender, elongate, almost uniformly wide from base to about the 7th segment, thenceforth acutely pointed to apex. Hind margin of tergites 2-6 with a very fine fringe, wanting in the middle; tergites 7 and 8 with a similar but complete fringe.

Measurements :

	Length	Breadth
Head	0.084 mm.	0.084 mm. across cheeks. 0.093 mm. across eyes.
Pronotum	0.108 mm.	0.078 mm. front margin. 0.120 mm. greatest.
Mesothorax	0.093 mm.	0.145 mm.
Metathorax	0.075 mm.	0.112 mm.
Abdomen		0.132 mm.
Wing (without fringes)	0.450 mm.	
Antenna	0.183 mm.	

Antennal segments	I	II	III	IV	V	VI	VII	VIII
Length in microns	15	26	33	28	30	35	6	9
Width in microns	21	22	18	18	15	15	6	5

Male.—About 0.6 mm. long. Apterous and without ocelli; otherwise much resembling the female. Abdomen without sternal depressions. Penis concolorous with body, curved upwards.

Measurements : Head 0.084 mm. long; prothorax 0.108 mm. long. Antenna 0.168 mm. long.

Antennal segments	I	II	III	IV	V	VI	VII	VIII
Length in microns	16	24	27	23	27	34	6	12
Width in microns	15	18	17	16	15	15	6	5

Described from two females and two males from among hundreds that were found breeding on the under-surface of the leaves of *Solanum melongena*, especially the thorny variety. The thrips moved about on the hairy surface sluggishly and would not skip even on being disturbed. This species differs from *Hydatothrips ramaswamiaki* Karny in being uniformly yellow and in having very few setae on veins of the fore-wings, etc.

Scirtothrips Shull.

- 1909, *Scirtothrips* Shull, *Entom. News* 20 (5) : 222.
 1912, *Scirtothrips* Jones, U.S.D.A., *Bur. Ent. Tech. ser.* 23, pt. 1 : 15.
 1914, *Scirtothrips* Hood, *Proc. ent. Soc. Washington* 16 : 240.
 1921, *Scirtothrips* Karny, *Treubia* 1 (4) : 237 and 240.
 1928, *Scirtothrips* Priesner, *Die Thysanopteren Europas* : 169.

This genus has the following characters as italicised by Shull himself : "Head is shorter than broad and shorter than prothorax. . . . One spine of moderate length is borne by each posterior angle of prothorax. . . . Species of this genus have the power of springing."

While distinguishing his *Scirtothrips* from *Anaphothrips* Uzel Shull further states that *Anaphothrips* Uzel does not allow inclusion of species with transverse heads. This, however, is questionable: Jones (1912) has pointed out that *A. tricolor*, *A. longipennis* and *A. albus* have heads noticeably wider than long; and *A. ramakrishnae* Karny, *A. transvaalensis* Faure and many others also have distinctly transverse heads; but all these are true *Anaphothrips* Uzel. The power of springing which is deemed important by Shull for distinguishing his *Scirtothrips* from *Anaphothrips* Uzel, in the absence of any significant structural character correlated with it, makes it impossible to distinguish dead specimens of one genus from those of the other.

Priesner (1928), in characterising *Scirtothrips* Shull, states that the fore-wing has mostly one distinct longitudinal vein and on this basis includes it in *SERICOTHRIPINAE* Karny. The genotype *S. ruthveni* Shull has two quite distinct longitudinal veins. Hence Priesner's statement, that the fore-wing has mostly one distinct longitudinal vein, is not valid for *Scirtothrips* Shull.

Hence the only character to which *Scirtothrips* can hold is the presence of only one seta near each hind angle of the pronotum. In the same way that *Neolimothrips* Shumsher is a subgenus of *Limothrips* Hal., and *Monochaetella* Pr. and *Dichaetella* Pr. are subgenera of *Dendrothrips* Uzel, *Scirtothrips* should be considered as only a subgenus of *Anaphothrips* Uzel, differing from the subgenus *Chaetanaphothrips* Pr. in having only one instead of two setae at each hind angle of pronotum. Thus while *Anaphothrips oligochaetus* Karny (1926) and *A. albus* Jones (1912) would belong to the subgenus *Scirtothrips*, *Scirtothrips spinosus* Faure (1929) would be a true *Chaetanaphothrips*.

Anaphothrips (Scirtothrips) dorsalis (Hood).

1919, *Scirtothrips dorsalis* Hood, *Insec. Insc. Menst.* 7: 90-91.

1926, *Anaphothrips oligochaetus* Karny, *Mem. Dept. Agr. India*, Ent. ser. 9 (6): 201 (New Synonymy).

1928, *Scirtothrips dorsalis* Ramakrishna, *Mem. Dep. Agr. India*, Ent. ser. 10 (7): 251.

1931, *Scirtothrips dorsalis* Ramakrishna & Margabandhu, *J. Bombay nat. Hist. Soc.* 34 (4): 1032.

As has been shown above, *Anaphothrips oligochaetus* Karny belongs to the subgenus *Scirtothrips* Shull by virtue of having only one seta near each hind angle of pronotum. From the original descriptions of *oligochaetus* Karny and *dorsalis* Hood the following are the only differentiating characters:

dorsalis

Head about 1.77 as broad as long.

Antennae about 3 times as long as head.

Antennal segments 4, 5 and 6 equal, 3 longer.

Lower vein of fore-wing with 2 or 3 setae (in female; Ramakrishna and Margabandhu's description of male—1931—does not give wing chaetotaxy).

In female the "abdominal segments 3-8 with a basal transverse dark line in the median fourth followed by a brown blotch."

A little broader species than *oligochaetus*.

oligochaetus

Head 1.42 as broad as long.

Antennae about 2.4 as long as head.

Antennal segments 3, 4 and 6 equal, 5 shorter.

Lower vein of fore-wing with only 1 or 2 setae (male and female).

"Margins between abdominal segments 3-7 in the female very narrowly brown."

The width of the body parts of weakly chitinised thrips in relation to length, especially in the case of the head, is greatly affected by the degree of thinness of the mounting medium (viz. Canada balsam in xylol in the present case) allowing the cover slip to flatten, more or less, the thrips below. In the case of

the dreaded chilli thrips (*Scirtothrips dorsalis* Hood) collected by me in July–August 1944 from *Capsicum annuum* and *Ricinus communis* leaves at Coimbatore, the head was found to be about 1.5 as broad as long in thick Canada-balsam, while in the thin medium it was about 1.8 as broad as long.

The length of the antennae within a small random collection of a dozen odd specimens varies from about 200 to 230 microns. The relative lengths of the antennal segments 3–6 show all sorts of variations, as will be seen from the table below where (a) is typical of *oligochaetus* and (b) of *dorsalis* (M indicates males, F females).

	Segments	M	M	F	F	F	F	F	F	F	F	F	F
				(b)		(a)							
III . . .		33	33	42	40	40	40	39	39	42	37	35	37
IV . . .		34	33	37	39	39	39	36	37	37	37	37	36
V . . .		33	34	38	37	33	32	31	30	30	33	33	32
VI . . .		36	34	39	42	40	39	37	37	39	39	39	39

With regard to the wing chaetotaxy, it is found that the females usually have two setae on the lower vein of fore-wing, but occasionally an extra, irregularly placed seta may occur on it. The male often has only one seta on this vein.

The chilli thrips that I examined have Hood's abdominal brown markings on the respective tergites and Karny's markings on the respective sternites. Evidently they each ignored one side of the female abdomen. It is noticed that, of the sternal markings, the lines between segments 4 and 7 stretch almost from side to side while that between 3 and 4 is confined to the middle third of the width of the abdomen.

I am therefore convinced that *Anaphothrips oligochaetus* Karny (1926) is synonymous with *Scirtothrips dorsalis* Hood (1919).

A NEW GENERIC NAME IN ACRIDIDAE (ORTHOPTERA)

By B. P. UVAROV, C.M.G., D.Sc., F.R.E.S.

My friend Mr. James A. G. Rehn has kindly drawn my attention to the fact that the generic name *Echinacris* Uvarov 1940, proposed by me to replace the preoccupied *Schinzia* Saussure 1899 (Orthoptera, ACRIDIDAE) is itself preoccupied by *Echinacris* Pictet 1888 (Orthoptera, TETTIGONIIDAE). This necessitates the following nomenclatorial change:—

Echinotropis nom. n. to replace *Echinacris* Uvarov 1940 (*Ann. Mag. nat. Hist.* (11) 6 : 377), nec *Echinacris* Pictet 1888 (*Mem. Soc. Phys. Hist. nat. Genève* 30 : 19), for the genus *Schinzia* Saussure 1899 (*Abh. Senkenberg. naturfor. Ges.* 21 : 648), with *Schinzia horrida* Saussure 1899 as the genotype.

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